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THE MEASUREMENT OF ACHIEVEMENT IN GEOGRAPHY

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THE
Measurement of Achievement in Geography

By

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THE MACMILLAN COMPANY, PUBLISHERS

NEW YORK :: 1925

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Set up and electrotyped. Published December, 1925.

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TO
MY FATHER AND MOTHER

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PREFACE

The province of geography is to discover and interpret the interacting relations between man and his physical environment. The progress of man is dependent on his ability to utilize earth resources. These resources are unequally distributed. Some regions have dense populations; other regions are practically uninhabited. People everywhere are coming to want the same kinds of products. This has led to the building up of elaborate transportation systems and the exchange of commodities. Geography is a comprehensive subject. It includes a countless number of places, facts, and interpretations.

Substantial progress has been made in evaluating geographic content and in discovering appealing methods of presenting the material. Slight emphasis has been placed on geography tests and scales. The teacher of geography should place suitable emphasis on (1) the selection of content, (2) methods through which content is taught, *and* (3) tests to discover whether educational outcomes are being realized.

It has been difficult to devise suitable tests in geography because the objectives have not been clearly and definitely established. The progress that has been made in the field of measurements makes possible the measuring of all definite educational objectives. The general acceptance of definite aims to be realized through geographic instruction will lead to the formulation of adequate tests,

which, in turn, will lead to a careful reëvaluation of content and methods.

Tests which can be measured only by the subjective judgment of the teacher, are very unsatisfactory because of the variable human factor that enters in. Different teachers place a different stamp of value on the same paper. Objective tests, which, barring clerical inaccuracy, can be graded by pupils as readily as by teachers, should be devised. Teacher and pupils can then work together for the realization of a common goal with the assurance that the degree of success or failure can be accurately determined.

Geography tests should measure achievement both on a memoriter and a problem level. They should stress the distribution of places, facts about regions, and interpretations of discovered relations. Some phases of geography can be measured without giving the pupil any assistance in memory recall. Other phases require the giving of assistance through the control of answers.

Practice tests, which may be interwoven as an integral part of the daily work of the child, should be provided. These tests should challenge the ability of the pupil to secure and interpret the printed page, diagrams, maps, and statistical tables. They should provide for the selection and organization of content. Practice tests should have definite teaching values.

Completion tests should be provided for the larger units of work. They should be given, not primarily to inform the child, but to discover the extent to which the objectives have been realized. They should reduce mechanical

work to a minimum, and permit the pupil to register many reactions in a short period of time.

Teachers should acquire skill in devising objective tests to meet their needs. In addition, use should be made of some of the standardized tests. The purpose of testing has not been realized until a careful analysis of results is made with the idea of improving instruction.

The author has measured the achievement of numerous classes with objective tests. This book has been written with the hope that other teachers will be assisted to realize the many advantages that come from the use of properly devised tests.

The author is indebted to Dean H. H. Hahn, State Normal School, Wayne, Nebraska; Public School Publishing Company, Bloomington, Illinois; Dr. C. A. Gregory, College of Education, University of Cincinnati; Ernest C. Witham, Department of Research, Wilmington, Delaware; the Whittier State School, California; McKnight and McKnight, Normal, Illinois; and The Macmillan Company for permission to present in this book brief excerpts from their publications.

Acknowledgments would not be complete without referring to the hundreds of students who have been an inspiration to the author in carrying on his experimental work to increase the efficiency of instruction. The author also is glad to acknowledge the helpful criticisms of P. A. Knowlton and C. C. Van Liew, members of the editorial department of The Macmillan Company.

MENDEL E. BRANOM

October, 1925.

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THE MEASUREMENT OF ACHIEVEMENT IN GEOGRAPHY

CHAPTER ONE

The Use and Value of Tests in Geography

The purpose of testing. Practically every teacher confronts her pupils with challenges in the form of written tests. The teacher plans to give tests; the pupils come to expect tests. Why are tests given?

The teacher discovers the extent to which she has realized the aims of instruction with each pupil. She can evaluate her work to determine why she has failed or succeeded. Further plans may be made according to her findings. The tests should reveal the pupils who need individual attention in order that they may meet the minimum requirements and the pupils who may be expected to go beyond the minimum requirements in their work.

The pupil discovers the extent to which he has mastered the work and perhaps compares his achievement with that of other members of the class, with the class median, or with a standardized median. The effect of the test on the pupil is important. Success without much effort may encourage the pupil to continue to depend on native talent or luck. Success because of faithful preparation of work may lead to a determination to con-

tinue to do superior work. Failure may leave the pupil in a hopeless state of mind or lead to a determination to increase his efforts to succeed.

The teacher uses tests in an attempt (1) to determine the standing of pupils, (2) to evaluate the effectiveness of instruction, (3) to secure the stimulus that will enable her to discover more effective methods of teaching, and (4) to impart to the pupil a stimulus that will prompt him to adopt more effective methods of learning.

Tests require the time of teacher and pupils. If the values of testing can be secured without the giving of tests, the work of the classroom is facilitated. If tests are justified, they must contribute something to the progress of the work that is not secured through class preparation and discussions. An analysis of the various kinds of tests that are given will be helpful in deciding whether the test is a necessary tool of the classroom teacher.

Written *versus* oral tests. Every class discussion is a form of testing. First one pupil, then another, contributes to the class discussion. Maximum group achievement may be tested in this way. But the class discussion cannot, except by a very haphazard method, indicate the exact achievement of each individual of the class. It is customary, however, to teach in groups. Pupils must also be tested in groups to conserve time. Group testing requires that written rather than oral tests shall be provided.

Judgment grades. Through class discussions, a teacher comes to have an opinion concerning the achievement of each pupil. This impression is cumulative. It is con-

stantly being modified according to the satisfactory or unsatisfactory reactions of each pupil. The standing of a pupil, as thus determined, may be thought of as the "judgment grade" of the teacher.

The larger the class the greater the possibility that the judgment grade of the teacher will be unreliable. For example, if there are ten pupils in a class, during a class period of thirty minutes, each pupil has an average of three minutes; if there are thirty pupils, each pupil has an average of only one minute. In either case a single pupil will be permitted to respond to only a small per cent of the questions. Moreover, the class discussion inevitably involves both difficult and easy questions. The teacher can hardly make due allowances for the varying nature of the questions so that all pupils will be fairly judged.

The following study illustrates the unreliability of grades given on the basis of haphazard oral questions:

An assignment on Argentina was made. The teacher prepared ten key-questions that she desired to place before the class. At the beginning of the recitation period, the pupils were asked to answer each of these questions on paper. The teacher, during the discussion, had no knowledge of what the pupils had written. She asked the questions and called on different members of the class of twenty-four pupils. The teacher recorded grades on the basis of oral recitations, and later recorded grades on the basis of the written work. The questions were asked and answered as follows:

1. How does the use of the land in the western part of the pampas differ from that in the eastern part?

   In the written test, there were 8 correct, 12 partly correct, and 4 wrong answers. In the oral test, the first pupil called on was given a grade of 60%, although his grade on the

written work of ten questions was 80%. The second pupil called on succeeded in completing the discussion satisfactorily and was given a grade of 100%, although in the written test his grade was only 75%. The pupil who had the better grasp of the assignment, as indicated by the written test, received the lower grade in class. Eight students presumably would have received a grade of 100%, if they had been called on, while four students would have been given zero.

2. Contrast the climate of northern Argentina with that of Patagonia.

   In the written test, there were 6 correct, 15 partly correct, and 3 wrong answers. In the oral test, the first pupil called on was given a grade of 70%, although his grade on the written test was 80%. The second pupil called on was given a grade of only 50%, although his grade on the written test was 95%. In the written test, the second pupil answered the question more satisfactorily than the first pupil, but he could not make the additional contribution expected in the oral recitation and so was given a lower grade.

3. What product is important around Tucuman?

   In the written test, there were 18 correct and 6 wrong answers. In the oral test, the first pupil called on was given a grade of 100%, and his grade on the written test was only 50%. Eighteen pupils could have made a grade of 100% on this question. Both pupils who were called on to answer question two and secured grades of only 70% and 50% respectively would have secured 100% on this question.

4. In what part of Argentina is the grape industry most important?

   In the written test, there were 24 correct answers. In the oral test, the first pupil called on was given a grade of 100%, and his grade on the written test was 100%. The two grades here show perfect correlation.

5. How does Argentina rank in sheep production?
   In the written test, there were 24 correct answers. In the oral test, the first pupil called on was given a grade of 100%, although his grade on the written test was only 50%. Every pupil could have secured 100% on this question.
6. Of what value is quebracho wood?
   In the written test, there were 10 correct and 14 wrong answers. In the oral test, the first pupil called on was given a grade of only 30%, although his grade on the written test was 70%.
7. Name the largest city of Argentina.
   In the written test, there were 24 correct answers. In the oral test, the first pupil made 100%, although his grade on the written work was only 40%.
8. What is meant by triangular voyages?
   In the written test, there were 6 correct, 9 partly correct, and 9 wrong answers. In the oral test, the first pupil called on made a grade of 100%, and his grade on the written work was 100%.
9. How does Argentina rank in South America in immigration?
   In the written test, there were 22 correct, and 2 wrong answers. In the oral test, the first pupil called on made a grade of 100%, although in the written test he had made a grade of 70%.
10. To what extent are Italians found in Argentina?
    In the written test, there were 12 correct, 8 partly correct, and 4 wrong answers. In the oral test, the first pupil called on made a grade of 80%, although his grade on the written test was only 70%.

At the close of the discussion the teacher had recorded grades for only 14 pupils. There were 10 pupils, which included over 40% of the class, for whom no grades had been recorded. It will be noticed that pupils with a

grade range of from 50% to 100% on the written test received 100% in the oral tests. The chance factor was too great to discover the achievement of pupils through the oral tests. The poorest student called on stood four chances in ten of being called on for the answer to a question he knew. He happened to be called on for one of these four questions. This study indicates that grades recorded for oral recitations are not very satisfactory. Class grades of this sort are merely suggesters to help the teacher form a judgment grade of the worth of each pupil's work. The judgment grade, taken by itself, is not sufficient to determine accurately the achievement of a pupil. It should be supplemented and checked by other suitable tests. There is an acute need for the devising of tests that will demand the same sort of reaction from every pupil.

Written tests during the class period. To overcome the weaknesses of the oral discussion, written exercises, at irregular intervals, may be given as a part of classroom procedure. The teacher may select one or two questions for a five-minute written exercise, or she may select ten or more questions that can be answered in a word or two. The pupils in this way all recite at the same time. Each pupil is confronted with the same mental challenge. In the oral recitation, some pupils are able to conceal their shortcomings while other pupils may give the false impression that they have mastered the assignment. The written test helps the pupils to feel that only faithful preparation of work is a guarantee of a favorable record.

Completion tests. From time to time, as the teacher completes large units of work, completion tests are given.

A similar test may also be given at the end of the term. The short recitation test reveals immediate achievement; the completion test reveals the residuum which promises to carry over as a part of the pupil's permanent equipment. The completion test, dealing with large units, indicates the extent to which the pupil can select the particular facts, from among a large number, necessary to meet the conditions of the questions. The "carry-over" of instruction in the form of usable knowledge is much more important than immediate achievement which involves few permanent values. Pupils who make a poor showing on recitation tests may make a much more favorable showing on completion tests. In fairness to the pupil, both types of tests should be given.

Announced tests. The formal test is duly announced in advance of the time that it is to be given. Each pupil has an opportunity to place himself in a state of preparation. The test is a stimulus which prompts the pupil to study, for the results of study will be necessary to meet the conditions of the test. If the test is to be based on a particular assignment, a high proportion of the students will attempt to master the assignment. The duly announced completion test may also have a similar general effect in raising the tone of class endeavor.

The formally announced tests, however, do not distinguish sharply between "cram achievement" and genuine achievement. Some pupils may assimilate the subject matter so that it becomes permanently interwoven into their mental lives; other students, at the last moment, may cram their minds with details merely to meet the test

challenge. The formal test does not necessarily indicate how the knowledge was acquired but merely the extent to which the knowledge was in the possession of the student at the time the test was given. Perhaps the chief value of the announced test, in terms of educational processes, is the mental awakening that just precedes the giving of the test.

Unannounced tests. The informal test is "sprung" on the class. The test comes unexpectedly like a bolt of lightning out of a clear sky. From day to day, the pupils have been studying assignments and entering into class discussions. Perhaps they have studied because of their inherent interest in the subject, because of their desire to participate in the discussion, or even because of the compelling magnetism of the teacher, or the urge of parents at home. Whatever the motive, neither the fear of, nor the love for, a particular impending test has entered in.

The pupils come to the classroom expecting the usual discussion. The teacher may ask the class to write on some part of the assignment. This type of test indicates the extent to which the pupils are taking the assignments seriously, or the extent to which they are able to master the assignments. Slackers in the daily work are more readily singled out than in an announced test. The level of achievement on which the class is working is readily discovered. The pupils may come to accept informal tests as a part of the work. The uncertainty of their occurrence may help to hold the pupils to a more effective mastery of content.

The unannounced test may relate to a large unit of work

that has just been completed or that was completed some time earlier in the child's training. The "cram" factor is thus eliminated. The nervous strain which may come from worrying about an announced test is avoided. The pupil is tested for knowledge that has been assimilated rather than for knowledge that makes a passing impression. The spread in grades between the faithful student and the indifferent pupil who crams before a test is widened.

The unannounced test may be used to discover the proportion of content that is forgotten, or, to look at the question from the positive viewpoint, the proportion of content that is remembered. An announced test will reveal the maximum temporary retention of knowledge. The teacher may then proceed to other topics. Later on, when the first unit has passed into the margin of consciousness the teacher may give the pupils an unannounced test on the same teaching unit. The distribution of students, e.g. whether upper, middle, or lower third of class, through these tests, is another important means of discovering relative standing. Moreover, a comparison of the grades made in the two types of tests will help to reveal the ultimate efficiency of instruction.

If the unannounced test, involving remote recall, is as difficult as the announced test, involving immediate recall, a lower range of grades should be expected. Inevitably pupils will forget a certain proportion of their past experiences. An easier test may result in even a higher range of grades than was made on the test for immediate retention.

Assignment and recitation tests. The time allotted

pupils for the study of geography is frequently divided between study periods and recitation periods. Tests help to reveal the extent to which pupils have mastered assignments during the study periods.

A teacher, without any prior announcement, gave the pupils five minutes to write on a sample question based on the assignment. The question was, "In what ways did the continental glacier form lakes in New England?" 13 of 28 students could not answer the question even in part correctly. The average grade of the class was 41.3%. The next day she gave a similar test using the question, "What advantages for manufacturing has New England?" 8 of the students could not answer the question even in part correctly and the average grade of the class was only 50.1%. The third day a similar test was given, the questions being, "What is the nature of the metal manufactures of New England? Name cities in which special products are important." This time the pupils had begun to understand that they could meet the requirements only by studying the assignments. Only two of the pupils could not answer the question in part, and the average grade of the class was 68.2%. The fourth day the teacher gave the question, "Name two ways that wood pulp is made from pulp wood." The pupils were now sure that they had to study the assignment to make a satisfactory record. Every pupil could write something on this topic, and the average grade of the class was 78.3%. In only four days, the average grade for mastery of assignment had been raised 37 points. Pupils will tend to master assignments for which they *know* they will be held responsible. If the

assignment merely leads to a discussion, some of the pupils who need to study the most will frequently neglect the assignment in the hope that they will be able to get by.

The recitation period formerly existed chiefly for a recitation on the assignment and to provide another assignment for the study hour. But to-day it is currently believed that a recitation period may also be an instruction period. Under the guidance of the teacher new material is mastered in class. Individuals or groups may make special reports. The teacher may make contributions. Books, maps, globes, and pictures may be studied by the class. Tests should be devised (1) to reveal the degree of mastery of assignments, and (2) to reveal the value of the instruction period.

Group and individual tests. The group test, if fair to individuals, must sample the content that all pupils have had an equal opportunity to master. But the instruction period offers an opportunity to develop interests that will lead to supplementary individual achievement. The educational world has become familiar with the thought that the school should provide for the social and also the individual needs and interests of pupils. The group test is related primarily to social needs, that is, achievement which the individual must have if he is to be a positive member of society. Tests, sufficiently comprehensive and elastic in nature, should be devised to discover the special achievements of each individual according to his particular interests.

Tests and standards. Tests are not standards but should conform to standards. Tests should be devised

according to the aims which the teacher has tried to realize. Tests should be helpful, therefore, in causing the objectives of instruction to stand out clearly. The more carefully the teacher attempts to measure achievement, the more clearly will she attempt to present her topics in anticipation of the tests. The teacher who has definite standards, and definite tests that have been worked out coördinately with the standards, will be materially assisted in the teaching processes.

Tests and methods. The content to be taught is determined by the objectives to be realized. The same objectives influence the methods employed and the nature of the tests devised. Content, methods, and tests are different aspects of the same teaching unit. A change in any one of these aspects is bound to have an effect on the other two. Each aspect owes its particular qualities to the established objectives or outcomes. A carelessly devised test is of little value. A carefully devised test reveals the extent to which the established objectives have become educational outcomes in the life of the child.

A satisfactory realization of outcomes is dependent on content and methods. Tests which are in harmony with the expectable outcomes, therefore, will help to insure a more careful selection of content, and a more effective use of methods.

Tests related to expectable outcomes. The devised tests should be in accord with the expectable outcomes. If knowledge is an outcome to be striven for, adequate tests should be constructed; if habits, skills, ideals, attitudes, outlooks, sympathies, and interests should be emphasized in

teaching, tests should be devised to discover whether these outcomes have been appropriately realized. The only requisite is that the outcomes shall be definite. What specific knowledge, what specific habits and skills, what specific ideals does the teacher want the child to acquire? If the test maker knows the specific outcomes that the teacher is striving for, his task of constructing suitable tests becomes relatively simple.

The desirability of written tests. Most of the time of teacher and pupils should be devoted to an attempt to realize geographic objectives. Too much emphasis should not be placed on testing. The foregoing discussion has presented to the reader the various viewpoints which should prevail in the giving of tests. Several of these viewpoints frequently are involved in the same test. The teacher should always remember that the pupil does not exist in order that he may take tests, but that the tests exist to check results, and to stimulate teacher and pupils to do their work more efficiently.

CHAPTER TWO

The Need for Objective Tests in Geography

Characteristics of a desirable test. Testing presupposes a preparatory period during which an attempt has been made to realize definite outcomes. The test should be so related to the objectives that the results will reveal with certainty whether a purpose has been realized. The test should involve simple mechanics in its construction so that pupils will readily understand what is to be done. The test should be no longer than is necessary to secure accurate results. An unreasonable amount of time should not be required in checking the papers. If the test is reliable, the marks for the same test paper, if corrected by two different teachers, or by the same teacher at different times, should be practically the same. The justice of the grade should be perceived by the pupil. The test should reveal with certainty the product of instruction.

Difficulties of making suitable tests. A test paper cannot be accurately evaluated unless the responses can be broken up into measurable units, each of which has an exact value. Many questions permit the introduction of so many facts, and the establishment or recognition of so many different relations among the facts, that a sufficiently detailed standard for grading becomes exceedingly complex. Too much of the teacher's time may be required to

master the key and to grade the papers according to the key.

Geography deals with (1) facts, and (2) interpretation of facts. A test dealing exclusively with definite facts can be readily devised and the responses can be easily measured. But twentieth century geography is concerned primarily with the interpretation of situations. An attempt is made to interpret the adjustments which people make to environing resources. These interpretations include past, present, and future adjustments.

The complex social adjustments of a group of people have almost invariably been made with reference to a complex of physical factors. Moreover, social and spiritual factors have frequently exerted important influences. It is very difficult to assign the proper value to each of the influences. Both teachers and students differ in their interpretations of geographic relationships. The relative values of the various factors, which help to explain the situation, vary according to the opinion of the evaluator. If the question deals with the possibilities of future human adjustments, the additional difficulty that both the future facts and interpretations are speculative, enters in.

The factual question, "In what country is Buenos Aires?" admits of but one correct response. The factual question, "What state leads in the production of iron ore?" can be answered in the same definite way. If there is agreement as to the facts of this nature to be taught, suitable tests can be devised.

The interpretative question, "What factors help to account for the fact that Chicago is the largest city of the

interior of the United States?" does not necessarily call for the same sort of definite response. The interpretative question, "What future readjustments may be confidently expected in the Ozark Region of Missouri?" offers an even greater divergence of possibilities in the responses.

That there are difficulties involved in devising suitable tests to measure achievement, no one will deny. A more compelling problem of the test maker, however, is to ascertain what definite responses the teacher expects in the field of interpretative geography.

Difficulties of grading tests. A class has written on the question, "Why has New England agriculture declined in relative importance?" What standards shall the teacher set up for grading the papers? She will be governed by what the pupils should have learned as a result of their individual study plus what they should have learned through class discussions. The possible responses should be broken up into measurable units. A numerical value should be placed on each of these units. A measuring rod can thus be established for grading the papers.

Perhaps the teacher lists the topics that should be considered. These topics are (1) relief, (2) soils, (3) climate, (4) the competition of industrial and commercial centers, (5) the competition of better agricultural lands, and (6) the location of New England with reference to improved transportation facilities. The teacher will consider whether the pupil has recognized the importance of each of these topics. Different pupils, however, may refer to the topics in a different order. The teacher will need to hold these topics in mind in any possible order.

The task of grading is difficult enough when the teacher merely attempts to discover whether each pupil has referred to each of the six topics. But the further question arises: What should the teacher expect the pupil to say about each of the topics?

(1) *Relief.* Should definite mountains, hills, lakes, and rivers be named? Should the paper discuss diastrophism, the work of running water and helping agencies, the work of the continental ice-sheet, and the nature of the bed rocks?

(2) *Soils.* What is the nature of the soil? Why is much of the soil thin? Why is much of the soil bowldery? Why is the soil of Cape Cod sandy? Why does the soil give low yields with a persistent steadiness from year to year?

(3) *Climate.* What is the difference in the growing season between northern and southern New England? How much rain falls annually? How is the rainfall distributed with reference to the seasons? What influences do latitude, altitude, and relations to the ocean have on rainfall and temperature?

(4) *The competition of industrial and commercial centers.* What has been the nature of this competition? What specific cities have been important? Has the decline due to this cause been general?

(5) *The competition of better agricultural lands.* Where are these areas located? What favorable factors are in these areas? What agricultural products have competed with New England products? What products are still important in New England? Has the competition benefited New England?

(6) *The location of New England with reference to im-*

proved transportation facilities. What are the advantages of the location of New England? What improvements in transportation have been made on land? What improvements in transportation have been made on water? How have these improvements affected the location of sustenance areas? What effect have these improvements had on the location of consuming areas for New England products? How have the advantages of the irregular coastline been utilized?

The teacher may finally decide the extent to which each of these topics should be discussed. She may decide that several possible reactions are of equal value and that full credit should be given if one of several reactions, thus classified, is advanced. Under such a scheme of grading, the pupil who answers the question more fully than the teacher requires is given no additional credit. Is this just to the pupil who has used more facts or who may have introduced new viewpoints that are just as good but were not considered by the teacher in the establishment of standards of measurement? If the pupil is asked to interpret the question according to his own viewpoint and his own organization, should his interpretation as a whole finally be considered as a unit? If the latter view is taken, specific standards are lost sight of and the teacher merely grades on the basis of a general impression.

The teacher, without any attempt to devise an objective measuring rod, may merely hold in mind a number of possible responses to the question. If she could grade all the papers under the same conditions, a rough sort of justice might be meted out in this way. But the papers

must be graded in succession. The conditions are constantly changing. Even the suggestions of the pupils help to change the teacher's standards. The varying physical and mental state of the teacher is another factor. The teacher tends to become more lenient or more severe in her grading as she passes from paper to paper.

The pupils of a class were asked to write on the follow-questions:

1. What advantages of location does Norfolk, Va., have over Wilmington, N. C.?

2. Why is truck gardening important on the Atlantic Coastal Plain?

3. Why are the four leading seaports of the southeastern coast of the United States so small?

4. Why are subtropical fruits grown in Florida?

The papers were graded by the teacher with the following results:

First Grading

No. of Paper	Grade	No. of Paper	Grade
1	87	11	83
2	76	12	89
3	68	13	62
4	73	14	65
5	78	15	70
6	82	16	80
7	65	17	65
8	70	18	76
9	81	19	85
10	60	20	88

Results when the order of the papers was changed, and the same teacher graded the papers a month later.

No. of Paper	Grade	No. of Paper	Grade
20	92	10	60
19	89	9	80
18	72	8	73
17	70	7	62
16	78	6	80
15	75	5	79
14	70	4	70
13	60	3	60
12	87	2	75
11	82	1	86

Without the knowledge of the teacher, the papers were arranged in the reverse order. A higher grade was given on the papers 1–5 in every instance, except one, when the papers were graded first. The sum of the points given papers 1–5, when the papers were graded first, was 382; the sum of the points given papers 1–5, when the papers were graded last, was 370. A higher grade, with a single exception, was given papers 16–20 when the papers were graded first than was given when the papers were graded last. The sum of the points given papers 16–20, when the papers were graded first, was 401; the sum of the points given papers 16–20, when the papers were graded last, was only 394. The standards for grading the papers probably became more definitely established as the teacher proceeded with the correction of papers.

Other studies show that the teacher tends to become more lenient as she grades the papers. Whether the teacher tends to become more severe or more lenient in the grading of papers is of little significance. The important thing to remember is that the standards of teachers tend to shift as papers are graded in succession.

After the papers have been graded subjectively, about all that can be truthfully said is that the grades represent what a particular teacher thinks each pupil is worth. The pupils compare papers. They discover apparent inconsistencies in the grades. The teacher is besieged with inquiries concerning the grades. She has extreme difficulty in explaining why certain grades were given. When the teacher listens to the analysis of a pupil, her faith in her own grades may be severely shaken. The teacher may

doggedly stand on the original grades, or she may revise the grades according to the requests of the pupils. This deplorable situation, whatever the outcome, has taxed the patience of both teacher and pupils. Surely simple and reliable methods of discovering achievement objectively are highly desirable.

Unreliability of grades in other subjects. Various studies have been carried on concerning uniformity of grading. The grades given to children in one ward school have been compared with the grades which the children made in other ward schools. Not infrequently, the pupils who enter a high school with low grades from one elementary school have done better than pupils who entered with higher grades from other elementary schools.

Experiments have also been carried on to discover the degree of correlation in grades given by different teachers for the same papers. Even in the field of mathematics, where there is marked definiteness of content, there is a surprising lack of approximate uniformity. It has also been found that the same teacher may vary materially in the grades which she assigns the same papers if an appropriate time interval has elapsed between the grading of the papers.

The ranking of papers dealing with place distributions. The pupils of a class were asked to draw a sketch map of Africa and to place thereon the important physical and political distributions. This requirement came at the conclusion of a detailed study of the continent. Twelve of the papers were selected for relative ranking by teachers who were well acquainted with the subject. Each of the

papers was designated by a number. The following table shows the number of times each paper was placed in the upper third, the middle third, and the lower third:

No. of Paper	No. of Times in the		
	Upper Third	Middle Third	Lower Third
1	18	25	7
2	33	15	2
3	10	31	9
4	8	19	23
5	2	7	41
6	6	18	26
7	4	11	35
8	27	17	6
9	9	24	17
10	39	8	3
11	2	18	30
12	42	7	1

Every paper was placed in the upper third by two or more teachers; every paper was placed in the middle third by seven or more teachers; every paper was placed in the lower third by one or more teachers. Paper 12, which was placed in the upper third by forty-two teachers, was placed in the middle third by seven teachers and in the lower third by one teacher. Paper 5, which was placed in the lower third by forty-one teachers, was placed in the middle third by seven teachers and in the upper third by two teachers. As indicated by the ranking, 12 was the best paper and 5 was the poorest paper. Most of the teachers were able to recognize the best paper and the poorest paper, or at least to agree on the best and the poorest paper, but

there was a marked difference of opinion on many of the papers.

The following table shows the number of times that each paper was ranked first and the number of times that each paper was ranked last among the twelve papers:

No. of Paper	No. of Times	
	Highest Rank	Lowest Rank
1	2	3
2	5	0
3	1	0
4	1	14
5	0	13
6	1	6
7	1	4
8	4	1
9	0	2
10	9	3
11	0	4
12	26	0

Eight of the twelve papers were given the highest rank by at least one of the fifty teachers. Nine of the twelve papers were given the lowest rank by at least one of the fifty teachers.

The teachers were informed of the nature of the work that had been done, but were not given definite standards for judging the papers. They were told to use their own standards of grading for such work. Considerable initiative was required on the part of the pupil in learning to draw a sketch map, and in deciding what place names to

emphasize. The papers, therefore, differed considerably in the accuracy of the sketch map, the accuracy of location, and in the number of places located. A comparative study of the ranks assigned indicates that the standing of a pupil was determined, to a considerable degree, by the accident factor. Either standardized ways of grading such an exercise should be devised, the exercise should be eliminated, or the teacher should merely accept or reject the product of the pupil, but hold him to the satisfactory completion of the exercise. In the latter case, the definite standing of the pupil should be determined by other forms of tests that can be accurately measured.

The ranking of papers dealing with a topical discussion. A class wrote on the topic, "Discuss the textile industry of New England." Twelve of the papers were ranked by fifty-seven teachers with the following results:

No. of Paper	No. of Times in the		
	Upper Third	Middle Third	Lower Third
1	31	13	13
2	12	38	7
3	41	12	4
4	9	17	31
5	28	25	4
6	0	0	57
7	6	35	16
8	9	20	28
9	17	38	0
10	2	10	45
11	14	20	23
12	57	0	0

Paper 12 was unanimously considered the best paper; Paper 6 was unanimously considered the poorest paper. All of the papers, except three, were placed in each of the thirds. In every instance, except in Paper 1, when the paper was placed the most times in the upper or lower third, the middle third ranked second in the number of times. While the variations were not so pronounced as in the grading of the place maps of Africa, the differences in ranking were still so pronounced that the reliability of results may be seriously questioned.

The ranking of papers dealing with a problem discussion. A class wrote on the problem, "What are some of the factors that help to account for the wonderful development of Los Angeles?" Twelve of the papers were ranked by forty-eight teachers with the following results:

No. of Paper	No. of Times in the		
	Upper Third	Middle Third	Lower Third
1	5	14	29
2	27	17	4
3	5	9	34
4	0	0	48
5	7	23	18
6	14	21	13
7	8	37	3
8	19	17	12
9	48	0	0
10	23	25	0
11	7	11	30
12	29	18	1

Paper 9 was unanimously considered the best paper; Paper 4 was unanimously considered the poorest paper. All other papers were placed in each of the thirds by one or more teachers. The same general weaknesses appear in the ranking of problem papers that appear in the ranking of papers dealing with place distributions or topics.

Distribution of grades related to an assignment. The country of Italy was studied by a group of elementary school children. The teacher attempted to interest the pupils in the book material by discussing the assignment. Difficult words were anticipated through this discussion. The pupils then studied the book material. Ten typical questions, each of which was definitely answered in the textbook, were selected for a written exercise. The questions were as follows:

1. Why does most of the rainfall of Italy come in the winter season?
2. Name and locate two volcanoes of Italy.
3. What are the three chief Italian grains?
4. What is the leading industry of Italy?
5. What products are sold at the government stores?
6. What product, used as an ornament, is secured from the sea?
7. What product is taken from the mountains near Carrara?
8. What was the Forum of Rome used for?
9. Name the three important seaports of northern Italy.
10. How do people go from place to place in Venice?

Twelve of the papers were selected for grading by twenty-seven teachers. The papers were graded on a per cent basis. Each teacher graded the papers according to her own standards. Each teacher who graded the papers read the book material so that she would have the ground

covered by the pupils vividly in mind. The results were as follows:

No. of Paper	No. of Times each Grade Was Given																			
	95	92	90	89	86	85	84	83	82	80	79	78	75	72	70	65	60	58	50	45	40
1	5	4	5	2	4	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	1	4	2	5	6	1	5	3	0	0	0	0	0	0	0	0
3	3	5	4	3	6	3	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	1	1	4	6	8	1	4	2	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	3	4	4	7	4	4	1	0	0	0	0	0
6	14	10	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	10	6	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	1	6	12	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	8	8	1	1
10	0	0	0	0	0	0	0	2	10	9	1	5	0	0	0	0	0	0	0	0	0
11	1	6	5	4	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	1	1	3	10	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0

Paper 6 was regarded as the best paper as shown by the fact that fourteen teachers gave this paper the highest grade, while no teacher gave this paper less than 90%. Paper 9 was considered the poorest paper. The grades assigned the best paper ranged from 90% to 95%; the grades assigned the poorest paper ranged from 60% to 40%. The poorest papers were apparently more difficult to grade than the best papers. The widest range in grades for any one paper was 20 points; the narrowest range was 5 points. The range of grades shows that, although the content was definite, the standards of the teachers varied.

The unreliability of subjective grades. A teacher graded a set of twenty-eight papers without placing grades or other marks on the papers. Eight months later she took the same set of papers and regraded them.

The questions answered on the test papers were as follows:

General Topic, New York State.

1. What is the value of the New York Barge Canal to New York State?
2. Why is Buffalo a better lake terminus for the Canal than Oswego?
3. Why is Albany a better location for the state capital than the geographic center of the state?
4. What are the advantages of location of New York City?
5. How has New York City been provided with a large water supply?

The table on page 29 shows the grades given each paper the first time and the second time it was graded.

Fifteen students received higher grades the second time than the first time; eleven students received higher grades the first time than the second time; and two students received the same grade. One student received 8 points more the second time than the first time; one student received 7 points less the second time than the first time.

Paper 12 was advanced from 21st place in rank to 13th place when the paper was regraded. Paper 24 was reduced from 3rd place to 9th place when the paper was regraded. The variations were not so pronounced as in the grading of the same paper by many different individuals. No student was shifted from the lower third to the upper third, or from the upper third to the lower third of the class as a result of the regrading. There were shifts, however, to the adjoining thirds. The variations were

sufficient, to lend strength to the viewpoint that more satisfactory methods of grading are highly desirable.

No. of Paper	Original Grade	Later Grade	Original Rank	Later Rank
1	68	76	26	22
2	95	92	1	2
3	86	80	9	16
4	78	81	18	13
5	90	92	4	2
6	83	76	14	22
7	60	65	28	28
8	89	82	6	12
9	69	77	25	21
10	83	78	14	19
11	92	95	2	1
12	75	81	21	13
13	83	79	14	17
14	71	76	24	22
15	87	92	8	2
16	76	71	20	25
17	84	90	11	5
18	73	67	23	26
19	84	88	11	8
20	62	67	27	26
21	90	90	4	5
22	79	83	17	11
23	86	81	9	13
24	91	86	3	9
25	74	79	22	17
26	84	90	11	5
27	88	85	7	10
28	78	78	18	19

Interpretation of the experiments. Surely the faith of the teacher, who believes that she knows what a pupil is worth through the customary forms of testing, must be shaken

when such anomalous results are secured. If the customary written tests are so unreliable, is it any wonder that some teachers have come to the conclusion that they can determine the grade or rank of a pupil just as accurately without the use of written tests? May it not be, however, that a teacher's opinion of the achievement of a pupil is just as unreliable? Is the fault due to a weakness that is inherent in all written tests, or is it possible to devise written tests that will permit accurate measurements?

The teachers, in grading, depend largely on (1) adequacy, (2) accuracy, and (3) form. Did the pupil introduce enough facts in his responses? Was he accurate in his statements and interpretations? Did he express himself in correct language? Each teacher places varying emphasis on these factors. Some teachers place emphasis on what the pupil suggests as well as on what he actually says. Some teachers read their own ideas into the paper. Some teachers grade more carelessly than others. Considering the almost limitless combination of factors that enter in when a paper is graded subjectively, is it to be wondered at that the conclusions reached are so widely at variance?

What effect does this sort of grading have on the pupil? Are we justified in assuming that the pupil is content to take whatever the teacher gives him? A pupil, as well as a teacher, frequently has his own opinion as to the grade he should receive. The pupil may come to recognize that personal factors may be more important than achievement factors in determining his standing in a class. To say the least, student morale is lowered when pupils once believe

that the accident factor is important in determining grades.

What can be done to overcome this deplorable situation? The good effects of a teaching unit are lessened to the extent that one or more of the factors, as lack of definite standards, poor methods, and unsatisfactory testing, are not what they should be. Many other things besides tests must be considered by the teacher. But tests that will accurately measure the achievements of pupils will do much toward helping the teacher to make her work an unqualified success. There is need for the devising of tests that will consist of measurable units that will give a pupil the same grade if the same teacher grades the paper at two widely separated time intervals, or if several similarly prepared teachers grade the papers. The tests will be even better, in their mechanical construction, if they involve merely clerical accuracy in grading so that the pupil himself can measure his own achievement and understand why he has a certain grade.

The task of devising such tests in geography is very difficult because of the complex nature of the subject and the lack of agreement on the definite standards that should be set up. The fact that the task is difficult is not a sufficient reason for making no attempt to improve the situation. Geography cannot have the position of esteem to which it is entitled until the teacher demonstrates that she knows what she is trying to do, that she knows how to teach content, and that she knows how to determine the efficiency of her instruction.

CHAPTER THREE

Criteria for the Determination of Test Materials

The relation of tests to standards. The nature of a test is determined by the objectives. If the objectives are not clearly defined, the devised tests are necessarily unsatisfactory. The slow progress that has been made in constructing tests for geography and history is due largely to the lack of agreement on outcomes. What facts should be stressed? What interpretations should be grasped? What place names should be retained? The field of geography is so rich in content that the expectable outcomes vary considerably in different classrooms and in different textbooks.

Criteria based on textbooks. The textbooks of geography follow very closely courses of study in geography. In general, improvement in the teaching of geography follows in the wake of improvement in equipment. The textbook influences the course of study; the course of study influences the nature of the textbook. A comparative study of typical courses of study and the leading textbooks suggests that the influence of the textbook has been the stronger. The advanced books of four series have been taken for a study of geographic content that may be used as a basis for the construction of tests. The books will be identified by numbers, 1, 2, 3, and 4. A random selection of Chile, for a comparative study, has been made.

Relative emphasis on place names. The place names mentioned in the discussions of the four geographic textbooks may be divided into two groups, (1) place names that are directly related to Chile, and (2) place names that are not intimately associated with the region of Chile.

Table One. Place Names directly associated with Chile

[The place names that occur in each book are indicated under the appropriate number.]

	Book One	*Book Two*	*Book Three*	*Book Four*
Mountains	Andes	Andes	Andes	Andes
Deserts	Atacama	—	—	Atacama
Oceans	Pacific	Pacific	—	Pacific
Capes	Horn	—	—	—
Straits	Magellan	Magellan	Magellan	—
Passes	—	—	—	Uspallata
Cities	Valparaiso	Valparaiso	Valparaiso	Valparaiso
	Santiago	Santiago	Santiago	Santiago
	—	Iquique	Iquique	Iquique
	Punta Arenas	—	Punta Arenas	—
	—	Antofagasta	—	Antofagasta
	Taltal	—	—	—
	—	Arica	—	—
	—	Caldera	—	—
	—	Valdivia	—	—
	—	—	—	Concepcion

There are sixteen place names, not including the place names, Chile and South America, that are mentioned in one or more of the four books.

3 names are mentioned in 4 books.
3 names are mentioned in 3 books.
3 names are mentioned in 2 books.
7 names are mentioned in 1 book.

Only 18¾%, or less than one-fifth of the names, are included in each of the four books; 43¾%, or over two-fifths of the names, are mentioned in only one of the four textbooks; 56¼% of the sixteen names are mentioned in Book One; 62½% are mentioned in Book Two; 37½% are mentioned in Book Three; and 56½%, are mentioned in Book Four. The highest proportion of names is found in Book Two; the lowest proportion in Book Three.

The fact that one book requires only six place names while another book requires ten place names suggests a difference in standards. This difference is further emphasized by the fact that sixteen different place names are mentioned in the four books. The Andes Mountains, Valparaiso, and Santiago are mentioned in each of the four books. The fact that the coast ranges, as proper place names, are not named in any of the books, while the Andes Mountains are invariably mentioned, shows a tendency to name the largest and most significant mountains. The two cities mentioned in each of the books are the two largest cities of Chile, while one is the capital, and the other one is the leading seaport.

Book Two, with ten place names, has a discussion of Chile which includes about 1500 words; Book One, with nine place names, has about 1450 words; Book Four, with nine place names, has about 1150 words; Book Three, with only six place names, has about 400 words. These facts seem to indicate that the introduction of additional place names is accompanied by longer discussions, and that the diversity of place names comes largely as a result of a richer discussion, which varies according to the viewpoint

of the authors. This conclusion is upheld by the fact that three of the place names in Book Three, the smallest list (Table One) of place names, are included in the four books, that two of the three place names, mentioned three times,

Table Two. Place Names remotely associated with Chile

	Book One	Book Two	Book Three	Book Four
1.	Panama	—	—	—
2.	Ecuador	—	—	Ecuador
3.	Argentina	—	Argentina	—
4.	New York	New York	—	—
5.	Panama Canal	—	Panama Canal	—
6.	Buenos Aires	—	—	Buenos Aires
7.	Europe	Europe	—	—
8.	United States	United States	United States	—
9.	New England	—	—	—
10.	Peru	Peru	Peru	—
11.	—	Germany	—	—
12.	—	Belgium	—	—
13.	—	France	—	—
14.	—	Holland	—	—
15.	—	United Kingdom	—	—
16.	—	North America	—	North America
17.	—	British Columbia	—	British Columbia
18.	—	Alaska	—	Alaska
19.	—	Norway	—	—
20.	—	Falkland Islands	—	—
21.	—	Washington	—	Washington
22.	—	Oregon	—	Oregon
23.	—	Mediterranean	—	—
24.	—	Los Angeles	—	—
25.	—	Baltimore	—	—
26.	—	Philadelphia	—	—
27.	—	California	—	California
28.	—	Melbourne	—	—
29.	—	Australia	—	—
30.	—	Bunbury	—	—
31.	—	—	Bolivia	—
32.	—	—	—	Lower California
33.	—	—	—	Mexico
34.	—	—	—	Juneau
35.	—	—	—	Coast Ranges
36.	—	—	—	Sierra Nevadas
37.	—	—	—	Cascades
38.	—	—	—	Valley of California
39.	—	—	—	Puget Sound
Total	10	24	5	16

are in Book Three, the other name also being implied in the context, and that the sixth place name is mentioned in one other book. The smallest list of place names does not include a single name that is not included in at least one of the other books. An analysis of the book discussions shows that the place names have not been introduced merely to teach the place names, but as an incidental contribution to a topic for discussion.

The most place names, remotely associated with Chile, (Table Two) are included in Book Two, which has the longest discussion. The fewest place names are included in Book Three, which has the shortest discussion. Four of the five place names included in the shortest list are also included in one or more of the other lists.

0 names are mentioned in all four books.
2 names are mentioned in 3 of the four books.
12 names are mentioned in 2 of the four books.
25 names are mentioned in 1 of the four books.

A more detailed discussion of a region leads to the introduction of more place names. The variations in place names become more pronounced as the discussions become more detailed. These facts suggest a greater difference of opinion concerning the content as the geographic horizon is broadened. Perhaps all books should contain the fundamentals, while greater freedom should be permitted in the introduction of details and less important topics.

Relative emphasis of facts about Chile.

Area and population.

Book One. About equal to twice area of California.

Book Two. Most people live in great intervening valley, which has about as many people as California.

Book Three. Nothing.

Book Four. Area nearly equal to our three Pacific States and population three-fourths as great. Smaller than any other Andean country except Ecuador.

Shape.

Book One. Long, narrow country, about 3000 miles, north to south, average width of 70 miles.

Book Two. Near to mountains, very narrow, more than 2500 miles long.

Book Three. Map showing where Chile would be along our Pacific Coast.

Book Four. Shoe-string republic, about 2700 miles long, average width little more than 100 miles. Would reach from southern end of Lower California in Mexico to Juneau in Alaska.

Relief.

Book One. Mountainous. Eastern border, young, rugged Andes. Near coast, old, worn-down mountains. Between mountain belts, at north, Atacama Desert. South of desert is the central valley.

Book Two. Back of desert Andean wall less broken, plateau wider. Like California in having interior valley between low coastal ranges, and higher inland mountain mass. South of 42° steep coast like British Columbia, Alaska, and Norway.

Book Three. On west slope of Andes. Low coastal range that shuts off interior as a wall.

Book Four. Compare with our Pacific Coast. Low coastal range and mountainous islands, lofty Andes on the east. Between systems, a long, narrow valley. South of 42° an "Inside Passage."

Climate.

Book One. North of 35° it never rains, nothing can grow.

Winds from southeast leave moisture on the east side of mountains. Beyond 35° south, abundant rain. Winds from west leave moisture on west slopes. Dry belt crosses mountains in central Chile.

Book Two. Adjoining desert, little snow in mountains. Streams too small to reach ocean between Arica and Caldera. In desert, years without clouds. Some people have never seen rain. California-Mediterranean region between 30° and 42° south. Winter rains and summer drought. Like California, Spain, and Italy. Climate delightful and healthful. South of 42° wind from the west. Roaring forties. Continuous rain and gloomy days. Within mountains, drier valleys. West end Strait of Magellan, gloomy with fog and cloud; east end sunny.

Book Three. North in tropics, central and southern parts in Temperate Zone. Great variety of climate. North Chile dry; south Chile wet.

Book Four. Similar to Pacific States. Northern part little wind from ocean, and arid. Heavy rains in southern Chile. District about Santiago has winter rains.

Agriculture.

Book One. Central valley, long and narrow with fertile land. Grows tropical fruits, sugar cane, cotton, rice, grapes, wheat, and corn. Wine.

Book Two. In desert only little oases at foot of mountain wall. California-Mediterranean region grows tropical and subtropical products. Irrigation from streams of snow-capped mountains.

Book Three. Agriculture is second interest. Irrigation in north. Moist and cooler parts have all grains and fruits of temperate regions. Wheat, cattle, and sheep.

Book Four. Many kinds of fruit, more common cereals, and vegetables. Grapes. In southern part of valley are apples.

Minerals.

Book One. Nitrate of soda in desert at north. Most valuable resource. Fertilizer. Many men at work. Railroads from coast. Building material, food, water, brought in, latter from as far as 100 miles. Lumps dug out of ground, dissolved in hot water, water cooled, nitrate comes out. Like coarse salt. Bags of nitrate taken to seaports. Rain would carry nitrate away. Almost all world's supply. Heavy export tax. Copper in large deposits.

Book Two. Nitrates 3000 to 5000 feet above sea. Long sheet of salt and nitrate. Would dissolve in rain. 50,000 men employed. Fertilizer, powder, chemicals. Shipped from Iquique, Antofagasta. Food and water brought in. Copper and iron ore near nitrate works. Iron ore deposits owned by American Co., which has built railroad, docks, steamships to carry ore to Baltimore and Philadelphia. Japanese own some iron ore fields. Export taxes on minerals nearly pay federal taxes.

Book Three. Mining most important industry. Nitrates in northern Chile. Fertilizer. Explosives. 3,000,000 tons annually. Most valuable of mineral deposits. Also copper, gold, silver, and other minerals.

Book Four. Silver in central and northern portions near Antofagasta. Coal around Concepcion. Copper and gold in large quantities. Large deposits of iron ore. Nitrate of soda more important than other minerals combined. Fertilizers. In northern Chile, 40 to 50 miles inland, in Atacama Desert for 30 miles south from Iquique. Scarcely any rain, no food plants, no materials for houses. No rain. Rain dissolves nitrate. Nitrate rock blasted, crushed, boiled, dissolved in water. Water evaporated and nitrate becomes crystals. Packed in sacks. Exported to England and Germany. United States sure to import more.

Forests.

Book One. Extensive; in central valley. Lumber important product of export.

Book Two. South Chile, dripping evergreen forests. May furnish lumber supply.

Book Three. Nothing.

Book Four. Extensive forests in south, but the wood decays rapidly.

Manufacturing.

Book One. Coal and water power. May become like New England, an industrial district. Sell manufactured goods to Argentina and Peru.

Book Two. Waterfalls, good climate. Factories near Santiago by foreign capitalists.

Book Three. Nothing.

Book Four. Nothing.

Transportation.

Book One. Nothing.

Book Two. Railroad entire length of great interior valley. Branches to small ports.

Book Three. Nothing.

Book Four. Railroad along interior valley. Over 8000 miles of railroads. Greater than mileage in all other Andean countries combined.

People.

Book One. Most Chileans descended from Spanish. Language is Spanish. Proud of descent. Not much intermarriage with natives. Mixed type indolent. Spanish came southward in boats from Panama.

Book Two. Excellent government and schools. Yankees of South America. Germans and Indians, called Araucanians, are near Valdivia.

Book Three. Nothing.

Book Four. Mixture of races. Peonage system. Spanish customs. 40% or more pure white stock. Remainder mestizos, or mixed bloods. 1860 to 1920 about 50,000 Europeans, mostly German and French, immigrated to Chile.

Fuel.

Book One. Coal and the presence of water power.

Book Two. Coal is high, use water power.

Book Three. Nothing.

Book Four. Coal near Concepcion.

Foreign relations.

Book One. Nitrate shipped to various parts of world; 4600 miles Valparaiso to New York, takes two weeks. To Buenos Aires across Andes 900 miles by rail, formerly via Cape Horn or the Strait of Magellan.

Book Two. Leading exporter of nitrate of soda.

Book Three. Some wheat exported. Trade with the United States is increasing. Favored by Panama Canal.

Book Four. Railroad across Andes from Valparaiso to Buenos Aires. Only transcontinental line in South America.

Cities.

Book One. Santiago, capital, 1800 feet elevation, delightful climate, beautiful parks, growing industries. Almost no chimneys but use of heating plants increasing. Valparaiso, no good harbors, expensive improvements so that boats can unload cargoes into small boats. Punta Arenas, on Strait, southernmost city of world; wool, hides, whale oil, furs, coaling station, repair docks.

Book Two. Valparaiso chief port; Santiago capital; nitrate ports, Iquique and Antofagasta.

Book Three. Valparaiso chief port, gateway to capital; Santiago, capital, about 500,000 people. Iquique, second port, nitrates. Punta Arenas, most southerly city of world, on Strait of Magellan, free port.

Book Four. No good harbors; Valparaiso principal port, hardly a harbor at all. Santiago, chief city, capital, 416,000 people, at northern end of Great Valley.

Future.

Book One. Nitrate deposits exhausted in 30 to 100 years. Rich forest lands of southern Chile.

Book Two. After nitrates are gone, people will move away from the desert. Possibility of sun power in desert. Southern forests may furnish lumber, but at present brought in from the United States. California-Mediterranean region the enduring part based on farming. Fresh fruits to United States. Experimental shipment to New York in 1921 of peaches, melons, apples, grapes. Freight cheaper, cost of producing fruit cheaper than in California.

The major topics discussed are (1) area and population, (2) shape, (3) relief, (4) climate, (5) agriculture, (6) minerals, (7) forests, (8) manufacturing, (9) people, (10) transportation, (11) fuel, (12) foreign relations, (13) cities, and (14) future.

The major topics may be grouped into two classes, (1) the physical background for human activities, and (2) human activities superimposed on the physical background. Most of the topics are treated in every book, while all of the topics are treated in two or more of the books. There is a wide range of difference in the extent to which each topic is treated, however, and also a difference in the details that are stressed.

All the books stress the shape and position of Chile, the coast range, the central valley and the Andes Mountains, the desert of the north and the rainy areas of the south, the agriculture of the central valley, the nitrate of soda in the desert, the chief port, and the capital city.

Other facts mentioned by one or more books, but in less than four, are the area and population, the Inside Passage, winter rains in the central valley, a comparison of the west and east ends of the Strait of Magellan, small oases in the desert, fruits, iron ore, gold and silver, coal, forests of southern Chile, water power, railroads of Chile, descent of the people, transcontinental railroads, Punta Arenas and its location, and Iquique and the nitrate exports.

It will be noticed that the second set of topics either presents more clearly the first set of topics, or presents notions that are not so vital in the present life of Chile. It may be assumed that those topics which are included in all the books are the most fundamental in developing a desirable grasp of Chilean geography. In a study of other countries, we may well expect the emphasis to be shifted according to the relative value of physical, economic, and social factors in influencing the modes of living and the distribution of the people.

Relative emphasis of problems about Chile. A mere statement of facts may furnish the raw material for answering interpretative questions. Some books may definitely raise interpretative questions, or stress the cause and effect relationship of facts. A study of the four books reveals the following interpretative questions that stand out clearly:

Book One.

1. How has the composition of the people affected the progress of Chile?
2. How did Valparaiso get its name?
3. Why does northern Chile have little rain?

4. Why does southern Chile have much rain?
5. Why would rain not be welcome in the Atacama Desert?
6. Why do the people of Chile have very few federal taxes to pay?
7. Why is it possible that Chile will become an important manufacturing country?

Book Two.

1. Why do few streams in northern Chile reach the ocean?
2. Why do the people of Chile have few taxes to pay?
3. Why would rain not be welcome in the desert of northern Chile?
4. Why is Chile beginning to use more water power?
5. Why do few people live in southern Chile?
6. Why does the California-Mediterranean region have the enduring future?
7. Why may fruit be exported in large quantities to the United States?
8. Why may a manufacturing region arise here?

Book Three.

1. Why is the country of Chile narrow?
2. Why does Chile have a great variety of climate?
3. Why is northern Chile dry and southern Chile wet?
4. Why is trade with the United States increasing?

Book Four.

1. Why is Chile sometimes called the "shoe-string republic"?
2. Compare Chile with the Pacific coastal region of North America.
3. Why is the part nearest the equator the driest?
4. Why have the forests not proved valuable for lumbering?
5. Why are apples grown in the southern part of the central valley?
6. How does the Great Valley help to explain the importance of Chile?
7. How has the composition of the people affected the progress of Chile?

8. Why is the want of rain in northern Chile a blessing?
9. Why is the United States sure to import more nitrate of soda?

Each book contains, not merely place names and statements of facts, but also interpretations of facts. These interpretations deal with (1) explanations of natural phenomena, and (2) explanations of human activities. In general the books with the longest discussions have the most place names, the most facts, and the most interpretations. It would seem as if place names, facts about places, and problems are vital aspects of geography. The enrichment of geographic content has led to an increased emphasis on all three phases. There is a considerable difference, among the books, in the situations that are selected for interpretations. None of the explanations are detailed and complete. The very nature of the problems makes it impossible to explain fully the questions raised. The teacher should help the child to understand that interpretative geography usually does not fully explain the questions raised, but merely stresses certain important factors.

Relative emphasis of creative problems. There is practically no provision in any of the books for genuine creative problem solving. The problems are worked out for the child as a part of the context. Most of the questions can be directly answered by referring to the map or the printed pages. There is little indication that the parts of the books have been built up with the idea of helping the child to bring material together for the interpretation of a question raised. The nearest approach is found in

Book Two and in Book Four. The first two of the following questions are found in Book Two, and the third question is found in Book Four. (1) An island near the west end of the Strait of Magellan is called Desolation Island. Why might this be a very appropriate name? (2) Write a brief comparison between Chile and the Pacific Coast districts of the United States. (3) Does Chile or Texas have the better prospects for future growth?

Even though provision should be made for creative problem solving, it will be difficult to devise tests that will measure the ability of the child to engage in creative thinking, because of the possibility that the problem may have come to the attention of the child on some previous occasion.

Conclusions. The analytical study of Chile indicates that all the books deal with (1) the location of places, (2) facts about places, (3) organized problems, and (4), to a minor extent, creative problems. All of these viewpoints should be held in mind in the devising of tests.

The location of places involves (1) the location of countries and states, (2) the location of physical features with references to countries, (3) the location of cities with reference to countries or states, and (4) the location of cities with reference to physical features.

Facts about places involve (1) largest cities and capitals, (2) products or activities that are especially important in certain cities, countries, or states, and (3) a consideration of locations, areas, physical forms and processes, soils, climate, agriculture, pastoral activities, mining, the forests, fisheries, manufacturing, fuel resources, people, foreign relations, cities, and the future of the regions.

The problems involve facts about places, but the facts are organized in such a way that they help to interpret a question that has been raised. If the facts have been organized in the textbook so as to interpret a situation, such a problem may be called an organized problem. If the problem has been raised and materials provided for its solution, such a problem may be called a creative problem if the student is left to interpret and organize the facts.

The books deal with the facts of the physical background and their interpretations, and with the facts of human distributions and activities superimposed on this physical background and their interpretations.

The facts most commonly stressed are those that have been fundamental to the progress and activities of the people, or those that are of special or characteristic significance. The mere ability of a country, region, or city to support a large number of people is an index of importance. The number of people administered from a capital city is an index of the importance of the political capital. The climatic and physical factors that have wielded the most influence in the lives of the people are most important. The economic activities that have been most fundamental or characteristic should be stressed the most. The importance of the activities or products is measured by intrinsic value to the city, region, or country, by relative importance when compared with other regions, and by the importance of the contributions which one region may make to other parts of the world.

The geography of a region is presented with reference to

relative values. A test that is standardized for general use should emphasize the fundamental things that should be taught to every child irrespective of the basic book that is used.

A comparative study of textbook material and typical courses of study shows a high degree of correlation in content. The conclusions reached with reference to textbooks, therefore, are also valid with reference to courses of study in geography. The standards of the textbooks are suitable for the listing of the outcomes that should be held in mind in the devising of tests to be standardized.

An analysis of textbooks shows that there are definite standards that the authors have usually adhered to in determining the content. The difficulty of recognizing these standards comes through a superficial survey of the books which results in a recognition that there is a difference in the details presented and in the less essential material that is included. The wealth of geographic material tends to bewilder and confuse so that the material of most worth is not clearly revealed except by careful, detailed study.

Similar studies of other regions, if space would permit, could be presented. The general conclusions, in each instance, are the same. An attempt has been made in this chapter to show that the content objectives can be discovered through a comparative study of textbooks and courses of study. It is possible, therefore, to construct tests that will measure definitely the extent to which the pupil has mastered geographic content.

CHAPTER FOUR

The Selection of Geographic Materials for Tests

Content to be included in tests. The nature of the material to be tested, as shown in the preceding chapter, may be discovered through an analytical study of geographic textbooks and courses of study. The material included in tests should be in harmony with the material included in the teaching units. Principles for the selection of test material will be illustrated by applying them to the continent of South America.

Population criteria applied to the countries of South America. In a general way, it may be assumed that the countries which support the most people are the most important countries of a continent. Population may be considered with reference to density per square mile, or with reference to the total population irrespective of area. The people of a region are able to live there because of the intrinsic value of the resources, plus the service they are able to render and the influence they are able to exert on the people of other regions. The producing and consuming ability of the people and the ideals which regulate their conduct are also important factors in determining the importance of a country.

Density per given area is somewhat misleading because many of the more important countries have been able to acquire large areas of relatively unproductive and sparsely

populated land. For example, if Brazil did not include the Amazon lowlands and the Matto Grosso Plateau, the average density of population would be much higher. On the other hand, the fact that Belgium is rather densely settled throughout gives to that country a much higher average density of population, in spite of the fact that the area is very small.

The ranking of countries on the basis of area alone is not satisfactory because of the marked differences in resources in various areas. Canada, for example, is larger than the United States proper, but the resources of the United States are incomparably superior, and the population of the United States is about fifteen times larger.

The production and consumption of articles per capita are valuable criteria that help to determine the importance of countries, but information concerning these factors, except for a few countries, is too meagre and unreliable to be of much assistance at the present time.

The ideals which influence the living conditions of people are very important but cannot be evaluated in such a way that there will not be a radical difference of opinion. While intrinsically, in terms of a personality, one individual may be of as much value as another, it is generally recognized that in terms of leadership, influence, and service there is a marked difference among individuals and among groups of individuals that live in various countries. Under present conditions, the attempt to determine the importance of countries through such criteria would result in controversy because of the extent to which opinion would enter in.

If reliable standards can be worked out for all these factors, their combined influences might be rated and used to determine the relative importance of countries. The relative rank of countries as thus determined corresponds rather closely to the rank of countries determined by the single criterion of the number of people living in a given country. There is general agreement as to the relative order of population for various countries. The standard, therefore, is absolute. The single criterion of population has been taken to determine the relative importance of countries.

Application of the population criterion to the countries of South America. The latest population statistics of the grade geographies have been used in compiling this table.

	Country	No. of People in Thousands
1.	Brazil	30,645,000
2.	Argentina	8,699,000
3.	Colombia	5,855,000
4.	Peru	4,586,000
5.	Chile	3,755,000
6.	Bolivia	2,890,000
7.	Venezuela	2,412,000
8.	Ecuador	2,000,000
9.	Uruguay	1,495,000
10.	Paraguay	1,050,000
11.	British Guiana	298,000
12.	Dutch Guiana	113,000
13.	French Guiana	49,000

The table of populations suggests an order in which the countries of South America should be emphasized. Thus, the countries, Brazil, Argentina, Colombia, Peru, and Chile, the first five, should be stressed more than the

countries with a smaller population. It is much more important that the pupil shall know the approximate location, principal cities, and resources of Brazil than of French Guiana. A blend of criteria will place Brazil and Argentina first. That the single criterion of population is not absolutely satisfactory, is suggested by the fact that Chile is placed after Colombia and Peru.

Population criterion applied to cities.

	Cities	Population in Round Numbers
1.	Buenos Aires	1,600,000
2.	Rio de Janeiro	975,000
3.	Sao Paulo	450,000
4.	Santiago	397,000
5.	Montevideo	378,000
6.	Sao Salvador (Bahia)	348,000
7.	Belem (Para)	275,000
8.	Rosario	222,000
9.	Recife (Pernambuco)	216,000
10.	Valparaiso	201,000
11.	Lima	143,000
12.	Bogota	139,000
13.	Asuncion	120,000
14.	Guayaquil	105,000
15.	Cordoba	104,000
16.	La Paz	100,000
17.	Caracas	86,000
18.	Quito	70,000
19.	Georgetown	54,000
20.	Valencia	54,000
21.	Barranquilla	48,000
22.	Maracaibo	48,000
23.	Arequipa	37,000
24.	Paramaribo	37,000
25.	Callao	36,000
26.	Sucre	29,000
27.	Cayenne	13,000

Other cities, mentioned in grade geographies, for which no population figures are given, are Santos, Manaos, Paita, Cerro de Pasco, Potosi, Punta Arenas, Bahia Blanca, Mendoza, Tucuman, Jujuy, Iquique, Iquitos, Oroya, Antofagasta, San Juan, Santa Fe, Paysandu, Curitiba, Victoria, Goyaz, La Plata, Santa Marta, and La Guaira.

Under the population criterion, it is more important that each pupil should know the cities with a population of more than 100,000 than the cities with less than 100,000 people. The list of cities thus secured should be supplemented with cities that are important for some special characteristics.

The capital city criterion applied to cities.

	Country	Capital	Population of City in Round Numbers
1.	Brazil	Rio de Janeiro	975,000
2.	Argentina	Buenos Aires	1,600,000
3.	Colombia	Bogota	139,000
4.	Peru	Lima	143,000
5.	Chile	Santiago	397,000
6.	Bolivia	La Paz	100,000
7.	Venezuela	Caracas	86,000
8.	Ecuador	Quito	70,000
9.	Uruguay	Montevideo	378,000
10.	Paraguay	Asuncion	120,000
11.	British Guiana	Georgetown	54,000
12.	Dutch Guiana	Paramaribo	37,000
13.	French Guiana	Cayenne	13,000

Under the single criterion of capital cities, those capital cities are most important that serve the most people. The

first five capitals are more important relatively than the last five capitals. The criterion here is not the size of the capital but the population of the country served by the capital, from the standpoint of political administration.

The seaport criterion applied to cities. A country not only is important because of the people that are supported within its boundaries, but also because of the contributions that it makes to the rest of the world. The primary points of contact that a country has with other countries is, in most instances, through its seaports. The leading seaports, therefore, should be considered.

Leading seaports of each country.

1. Brazil	Rio de Janeiro
2. Argentina	Buenos Aires
3. Colombia	Cartagena
4. Peru	Callao
5. Chile	Valparaiso
6. Bolivia	———
7. Venezuela	La Guaira
8. Ecuador	Guayaquil
9. Uruguay	Montevideo
10. Paraguay	———
11. British Guiana	Georgetown
12. Dutch Guiana	Paramaribo
13. French Guiana	Cayenne

Leading physical features. Those physical features that are of outstanding significance from the standpoint of the influence that they exert on human activities should be stressed the most. Some features are significant by reason of their very bigness, while other features have an intensified influence. Some features exert a positive in-

fluence; some features exert primarily a negative influence.

Physical features.

Rivers — 1. Amazon. 2. Plata. 3. Orinoco. 4. Magdalena.

Lakes — 1. Titicaca. 2. Maracaibo.

Mountains and plateaus — 1. Andes. 2. Aconcagua. 3. Bolivia. 4. Bogota. 5. Patagonia.

Capes — 1. Horn. 2. St. Roque.

Oceans — 1. Atlantic. 2. Pacific.

Seas, bays, gulfs— 1. Caribbean.

Islands — 1. Falklands. 2. Galapagos. 3. Trinidad. 4. Tierra del Fuego.

Special regions — 1. Atacama. 2. Llanos. 3. Pampas. 4. Campos. 5. Gran Chaco. 5. Central Valley of Chile.

Cities known for special products.

1. Sao Paulo — inland coffee center.
2. Recife (Pernambuco) — sugar and tobacco center.
3. Sao Salvador (Bahia) — cacao bean center.
4. Santos — chief coffee port.
5. Para — chief rubber port.
6. Manaos — rubber center.
7. Porto Alegre — live stock center.
8. Curitiba — maté and lumber.
9. Obidos — cattle.
10. Goyaz — live stock center.
11. Victoria—iron ore exports.
12. Buenos Aires—meat packing, grain.
13. Cordoba — flax.
14. Montevideo — meat products.
15. Guayaquil — cacao beans.
16. Mendoza — fruit.
17. Concepcion — coal.
18. Rosario — wheat and corn.
19. Tucuman — cane sugar.
20. Iquitos — nitrate.
21. Arequipa — alpaca and vicuna wool.
22. Antofagasta — nitrate.
23. Valdivia — lumber.
24. Paita — petroleum.
25. Santa Marta — bananas.
26. Cerro de Pasco — copper.
27. Punta Arenas — wool.

Countries known for special products.

1. Argentina — wheat, corn, cattle and sheep, flaxseed.
2. Brazil — iron ore, coffee, cacao beans, rubber, yerba maté.
3. Chile — nitrate of soda, copper.
4. Bolivia — tin.
5. Colombia — emeralds, platinum.
6. British Guiana — aluminum ore.

Important facts about South America.

Agriculture.

Argentina. 1. The pampas is the leading cereal region of Argentina. 2. The wheat belt of Argentina extends inland farther from the ocean than the corn belt. 3. Orchards and vineyards are numerous in the irrigated districts of the Andean foothills of Argentina. 4. Sugar cane is an important product of northern Argentina. 5. Argentina leads other South American countries in the raising of flaxseed.

Chile. 1. The most valuable farming region of Chile is the Central Valley. 2. Farming is not very important in southern Chile. 3. Farming, in northern Chile, is confined to small areas that can be irrigated.

Peru. 1. Peruvian cotton, grown under irrigation, is known for its excellent quality.

Bolivia. 1. Cereals and potatoes are grown, on small farms, in the plateau of Bolivia. 2. Coffee and cacao beans are leading products of the eastern lowlands of Bolivia.

Ecuador. 1. Ecuador is one of the two leading countries of South America in the production of cacao beans. 2. Large crops of sugar cane and cacao beans are raised on the coastal lowlands of Ecuador.

Colombia. 1. There are sugar cane and cacao plantations on the coastal lowlands of Colombia. 2. Banana plantations have been established on the coastal lowlands. 3. Coffee is grown on slopes in the interior.

GUIANAS. 1. Sugar cane and rice are important products of the Guianas.

VENEZUELA. 1. Coffee is an important product of Venezuela.

BRAZIL. 1. Brazil leads all other countries of South America in the production of cacao beans. 2. Brazil is one of the two leading countries of South America in the production of mate or Paraguay tea. 3. Manioc is grown in Brazil for the roots, which are made into flour for bread. 4. Brazil raises more coffee than any other country. 5. Sugar cane, tobacco, and cacao beans are important products of the coastal lowlands of Brazil. 6. The growing of wheat and oats is important in the southernmost part. 7. Most of the large corn crop is consumed by the people and the live stock. 8. Very little of the Amazon Basin has yet been placed under cultivation.

Pastoral activities and animals.

ARGENTINA. 1. Sheep raising is more important than cattle raising in southern Argentina. 2. Cattle raising is more important than sheep raising in northern Argentina. 3. Most of the cattle and sheep of Argentina are in the pampas. 4. The native pastures of the pampas have been supplemented with fields of alfalfa. 5. Corn is not used as a stock feed as much as in the United States. 6. Argentina has more sheep than any other country of South America.

URUGUAY. 1. The raising of cattle and sheep is the leading industry.

PARAGUAY. 1. The chief occupation of Paraguay is grazing.

CHILE. 1. The Central Valley is the leading region in the raising of cattle and sheep.

PERU. 1. The chief domestic animals of the plateau of Peru are the llama and the alpaca.

BOLIVIA. 1. Sheep, llamas, and alpacas are raised in the plateau of Bolivia.

ECUADOR. 1. The western slope of Ecuador is an excellent grazing country for cattle.

COLOMBIA. 1. Many sheep, alpacas, and llamas are pastured on the broad plateaus of Colombia.

VENEZUELA. 1. The great lowland of southern Venezuela is an excellent pasture land for cattle. 2. Many turtles are caught along the rivers of southern Venezuela.

BRAZIL. 1. The cattle industry is important in the grasslands of central and southern Brazil.

Minerals.

ARGENTINA. 1. Argentina is not an important producer of minerals.

CHILE. 1. Mining is the most important industry of Chile. 2. Nitrates are the most valuable mineral deposit of Chile. 3. Chile produces much copper.

PERU. 1. Peru is very rich in gold and silver. 2. Petroleum is secured from the coastal plain of northern Peru. 3. Copper is the most important of the mineral products of Peru.

BOLIVIA. 1. Tin ore is the largest mineral export of Bolivia. 2. Bolivia ranks second in the world in the production of tin.

ECUADOR. 1. It is believed that Ecuador has rich mineral resources, but very little mining is being done.

COLOMBIA. 1. Gold and platinum are important products of Colombia. 2. More emeralds are secured from Colombia than any other country.

VENEZUELA. 1. There are valuable pearl fisheries along the coast of Venezuela.

BRAZIL. 1. The largest iron ore deposit known in South America has been discovered in Brazil. 2. Gold and diamonds are secured from the Brazilian highlands. 3. Some beds of low-grade coal have been found in southern Brazil.

GUIANAS. 1. Gold is mined in the Guianas, especially French Guiana. 2. British Guiana has large deposits of bauxite ore, from which aluminum is made.

Forests.

ARGENTINA. 1. From the forests of northern Argentina is secured the quebracho wood from which an extract for tanning hides is secured. 2. The more highly developed part of Argentina was almost treeless when the white man came.

URUGUAY. 1. Uruguay has large areas of rolling grasslands.

PARAGUAY. 1. Paraguay has large forests.

CHILE. 1. There are extensive forests in southern Chile.

PERU. 1. Quinine is secured from the cinchona tree in the forests of Peru. 2. Leaves from the coca tree of Peru are chewed by the natives to give them greater endurance. 3. Rubber is secured from the forests of eastern Peru.

BOLIVIA. 1. There are very few trees in the plateau of Bolivia.

ECUADOR. 1. Ecuador is an important source of vegetable ivory used in the making of buttons. 2. The eastern part of Ecuador is covered with a dense forest growth.

COLOMBIA. 1. There are dense jungles on the coastal lowlands of Colombia. 2. On the east slopes of the Andes, in Colombia, are thousands of rubber trees.

VENEZUELA. 1. About half of Venezuela is covered with forests.

BRAZIL. 1. Dense tropical forests are found in the lowlands of Brazil.

Manufacturing.

ARGENTINA. 1. Argentina has not very much coal and iron ore as a basis for manufacturing. 2. The meat packing industry has become very important in several cities that are on navigable waterways.

URUGUAY. 1. Large quantities of beef extract are made in Uruguay. 2. Meat packing is an important industry of Uruguay.

PARAGUAY. 1. The women of Paraguay are skillful in the making of laces.

ECUADOR. 1. Many Panama hats are woven in Ecuador.

Transportation.

ARGENTINA. 1. Most of the railroad mileage is in the pampas. 2. The capitals of Argentina and Chile are connected by a Trans-Andean railroad. 3. The northern part of the pampas is better supplied with navigable waterways than the southern part.

PARAGUAY. 1. Paraguay is connected with Buenos Aires both by a navigable waterway and by a railroad.

CHILE. 1. The shortest distance from New York City to Chile is by way of the Panama Canal.

PERU. 1. A railroad extends from the sea coast of Peru to a large navigable lake on the border of Bolivia. 2. The highest railroad in South America is in Peru.

BOLIVIA. 1. Bolivia is connected by rail with an Atlantic seaport of Argentina. 2. Products are taken by way of the Amazon River system to the ocean. 3. Bolivia is connected by rail with several Pacific seaports.

ECUADOR. 1. The national capital of Ecuador is connected by rail with the leading seaport.

VENEZUELA. 1. The capital is connected with a seaport by a narrow-gauge railroad.

COLOMBIA. 1. Much of the commerce is dependent on a navigable river.

BRAZIL. 1. With the exception of a railroad built around the falls of a river, the whole Amazon lowland is without railroads. 2. Most of the railroads are in the southern part and near the coast.

People.

ARGENTINA. 1. Most of the people belong to the white race. 1. Spanish is the prevailing language. 3. Most of the white people belong to the Latin race.

PARAGUAY. 1. Most of the people are Indians.

URUGUAY. 1. Most of the people belong to the white race.

CHILE. 1. Most Chileans are directly descended from the Spanish race.

BOLIVIA. 1. About half the people are Indians. 2. Most of the houses of the plateau are made of stones or mud.

ECUADOR. 1. In Ecuador many houses are built so as to lessen damage by earthquakes. 2. The people of Ecuador make many uses of the century plant.

COLOMBIA. 1. The more highly developed part of Colombia is in the plateau of Bogota in the interior.

VENEZUELA. 1. Most of the white people live in the highlands.

BRAZIL. 1. Portuguese is the chief language. 2. Many negroes live in the coastal cities. 3. Many Italians live in the coffee district. 4. Many Germans have settled in the southern part. 5. The Amazon Basin is inhabited largely by Indians.

Foreign relations.

ARGENTINA. 1. The chief imports are manufactured goods. 2. The agricultural exports are more important than the mineral exports. 3. The exports of the animal products are more valuable than the exports of products of the forests. 4. Argentina exports more corn than any other country. 5. Most of the immigrants, within recent years, have come from Italy.

URUGUAY. 1. The leading exports are animal products. 2. The leading imports are manufactured goods.

PARAGUAY. 1. Paraguay tea and oranges are leading exports.

CHILE. 1. The most important mineral exported is nitrate of soda. 2. Chile exports much copper.

PERU. 1. Most of the rubber from the tropical forests reaches the ocean by way of the Amazon River. 2. Peru exports sugar, cotton, and Panama hats.

BOLIVIA. 1. The chief export is tin.

ECUADOR. 1. Ecuador exports a high grade of coffee from the uplands.

VENEZUELA. 1. The chief export is coffee.

BRAZIL. 1. Coffee is the most valuable export. 2. Brazil exports to other South American countries large quantities of Paraguay tea or maté. 3. The chief export of the Amazon Basin is rubber. 4. Brazil imports mainly manufactured goods.

GUIANAS. 1. The exports of the Guianas are not very important.

Problems related to South America.

1. Why has South America made less rapid progress than North America?
2. Why is the United States deeply interested in South America?
3. Why does the United States encounter such keen competition from Europe for South American trade?
4. Why is the Amazon Basin less useful to man than the Mississippi Basin?
5. Account for the greater density of population in Brazil, on or near the coast from Cape St. Roque southward, than elsewhere in Brazil.
6. How have the various groups of foreigners contributed to the development of Brazil?
7. Why do the important cities of Brazil depend on navigable waterways?
8. Under what conditions of adjustment or readjustment to earth resources may Brazil finally come to support 100,000,000 people?
9. Account for the concentration of people in the pampas of Argentina.
10. Why is Buenos Aires the leading city of Argentina?
11. Does Uruguay have the basis for a more important future development than Paraguay?
12. Account for the concentration of the agricultural activities of Chile in the Central Valley.

13. Have the resources of the desert of northern Chile compensated this country for its war with Peru and Bolivia?
14. Is it possible that the forested area of Chile will become a much more valuable possession than the desert area of the north?
15. Account for the importance of Santiago and Valparaiso.
16. Why should Peru have difficulties in developing an intense patriotism toward the central government?
17. How is Bolivia gradually overcoming the handicaps of her isolation?
18. In comparing the development of Ecuador with that of Peru, do you find that the people have adjusted themselves in a similar way where the conditions are similar and in a different way where the environment is different?
19. Why are the Caribbean seaports of Colombia more important than those of the Atlantic Coast?
20. Why is the Magdalena River route to Bogota more popular than the Orinoco River route or the approach through Buenaventura?
21. Why are the people of Colombia distributed in the highlands to a greater extent than in the lowlands?
22. What factors help to keep the seaports of Venezuela smaller than the inland cities?
23. Why does not the Orinoco River have as strong an influence in the life of Venezuela as the Magdalena River has in the life of Colombia?
24. Why is it fortunate for Venezuela that British Guiana was not extended according to the wishes of Great Britain to the mouth of the Orinoco River?
25. Account for the fact that the Guianas support a sparse population.
26. Why are the islands related to South America of little economic value?

27. Is it worth while for the people of the United States to strive to develop closer social, political, and economic relations with South America?

Test materials. The suggestive analysis of geographic content supplies the needed material for the construction of tests. The teacher will need to take representative samples of the (1) place and cultural features, (2) facts about South America, and (3) problems relating to South America, to be included in the tests. The scores made by the pupils will indicate the extent to which they have a knowledge of areal distributions and facts, and the extent to which they can use this knowledge relationally in the interpretation of vital geographic situations.

CHAPTER FIVE

The Mechanics of Geography Tests

The necessity of symbols for expression. The teacher is interested in discovering the ideas which the pupil has secured as a result of his study of geography These ideas, however, can be revealed only through symbols. The teacher must inform the pupil of what she wants through media of expression; the pupil must tell the teacher what he knows through media of expression.

The pupil must understand the mechanical form of the test. If he does not understand the directions and the test form, or if his attention is concentrated on an attempt to understand the tests, he cannot do his best work in answering the questions. Tests, therefore, should be sufficiently simple that the pupil may readily understand what he is expected to do.

The pupil should be prepared for the mechanical form of the test so that testing will actually show his achievement. If a test form, to which he is not accustomed, is to be used, sample tests, with the correct responses given, should be placed before him and explained. Not infrequently there may be a wide range of grades, not because the pupils have a different degree of mastery of the topic, but because some pupils have not clearly understood what is to be done.

Pure language tests. Tests most frequently involve language as the medium of expression. The requirements are stated in words and the responses call for the use of words. Many forms of tests are possible through the use of language.

Example One. On the line following each question, write the correct answer.

1. Name the largest city of New England._____
2. Name the highest mountain peak of New England. _____
3. Name the longest river of New England._____
4. Name the longest tunnel of New England._____
5. Name the state that leads in the production of cranberries. _____
6. Name the most densely populated state of New England. _____
7. Name the state of New England that leads in manufacturing. _____
8. Name the state that leads in the quarrying of slate. _____
9. Name the capital of Rhode Island._____
10. Name the city that leads in the fishing industry. _____

Example Two. The form of the challenge may be stated as follows:

1. What is the name of the largest city of New England? _____
2. What is the name of the highest mountain peak of New England?_____
3. What is the name of the longest river of New England? _____
4. What is the name of the longest tunnel of New England? _____

5. What is the name of the state that leads in cranberry production?_____
6. What is the name of the most densely populated state? _____
7. What is the name of the most important manufacturing state?_____
8. What is the name of the state that leads in the quarrying of slate?_____
9. What is the name of the capital of Rhode Island? _____
10. What is the name of the city that leads in the fishing industry?_____

Example Three. The form of the challenge may be stated as follows:

1. _____is the largest city of New England.
2. _____is the highest mountain peak of New England.
3. The _____ River is the longest river of New England.
4. The _____ Tunnel is the longest tunnel of New England.
5. The state of _____ leads in cranberry production.
6. The state of _____ is the most densely populated state.
7. The state of _____ is the most important manufacturing state.
8. The state of _____ leads in the quarrying of slate.
9. The city of _____ is the capital of Rhode Island.
10. The city of _____ leads in the fishing industry.

Example Four. The missing word test may be in paragraph form.

New England is a rugged region. Its highest peak is Mt. _____. The rivers, in general, flow southward. The longest river is the _____. There is much water power, the greatest single water power site being at the city of _____, on the _____ River. The rivers are tidal. Bangor is at the head of navigation of the _____ River. The city of _____ is at the head of navigation of the Connecticut River. There are many lakes, the largest of which, wholly within New England, is Lake _____. The construction of a railroad westward from Boston required the construction of the_____ _____ Tunnel.

The state of _____ has the most people, but the state of _____ is the most densely populated. The largest city is _____. The second largest city is the city of _____, on _____ Bay. Small metal products are made in many cities. The city of_____ _____ is known for tacks, the city of _____ for cheap watches, the city of _____ for high grade watches, the city of _____ for sewing machines, the city of _____ for cheap jewelry. Many cities are known for textile manufactures. The city of _____, on Buzzards Bay, is known for cotton cloth; the city of Lawrence, on the _____ River, is known for woolen cloth. Many cities are known for paper manufacture. The city of _____, on the Connecticut River, is known for its high grade paper; the city of _____, in northern Maine, is known for its paper made from wood pulp. The fishing industry has become concentrated in a few cities. The city of _____ is the largest fishing center. The city of _____, protected from the ocean storms by Cape Ann, is also important in the fishing industry.

In all the illustrations given above no assistance in recall is given the pupil except as the question itself may help the pupil to make the proper association. In a test that involves unassisted-memory recall, it is necessary, for objective grading, that only one correct reaction shall be possible. If several reactions are possible, the guess factor is increased, the teacher, in grading, must hold several possible reactions in mind, and frequently there are gradations from a very good answer to a very poor answer, which makes the teacher feel that she should grant part-credit for some of the answers.

That the unassisted-memory recall type of test has severe limitations in the construction of objective tests is suggested by the following illustration:

1. Name a special crop of New England._____
2. Name a cotton manufacturing center of New England. _____
3. Name an important fishing center of New England. _____
4. Name an important seaport of New England._____
5. Name an important river of New England._____

Not only are several answers possible for each of the questions, but the adjectives "special" and "important" admit of an elastic interpretation of the questions.

Even more indefinite is a missing word test of the following type:

1. The coastline of New England is _____
2. Many people visit _____ because of its historic associations.
3. Boston is a well-known center for _____

4. The scenery of the _____ Mountains is beautiful.
5. The soils of New England are _____.

This test admits too many different responses. If the pupil completes the sentence so that the statement is truthful, he must be given full credit. While the exercise may be valuable as a mental stimulus, it can hardly gauge accurately the pupil's achievement.

Assisted-memory recall. In the assisted-memory-recall type of test the pupil is given his choice of several answers. The number of answers to select from should be sufficient to reduce the guess factor to a minimum. The pupil does not need to waste his time in attempting to recall the proper responses. The factor of accident in recall is virtually eliminated. More separate reactions can be secured in a given time.

Form One.

1. Underline the name of the largest city of New England. (1) Providence. (2) Boston. (3) New Haven. (4) Hartford. (5) Worcester.
2. Underline the name of the highest mountain peak of New England. (1) Mt. Katahdin. (2) Mt. Washington. (3) Mt. Monadnock. (4) Mt. Holyoke. (5) Mt. Adams.
3. Underline the name of the longest river of New England. (1) Merrimac. (2) Connecticut. (3) Penobscot. (4) Kennebec. (5) Androscoggin.
4. Underline the name of the state that leads in cranberry production. (1) Maine. (2) Massachusetts. (3) Rhode Island. (4) Connecticut. (5) New Hampshire.
5. Underline the name of the city that leads in the fishing industry. (1) Portland. (2) Eastport. (3) Boston. (4) Gloucester. (5) Providence.

Form Two.

Opposite the name of each city, write the name of the product, taken from the following list, for which the city is best known.

Products.

1. Watches. 2. Cotton cloth. 3. Fish. 4. Looms. 5. Paper. 6. Tacks. 7. Cheap jewelry. 8. Sewing machines. 9. Lumber. 10. Petroleum.

Cities.

1. Boston....._____
2. Worcester....._____
3. Millinocket..._____
4. Waltham....._____
5. Fall River...._____

To reduce the amount of mechanical work required, the pupil may be asked merely to write the number of the product after each city.

Form Three.

The test may be a pairing test. The number of cities and products will be the same

On the line, opposite each city, write the number, taken from the second list, that shows the product for which each city is best known.

1. Boston....._____	1. Watches.
2. Worcester....._____	2. Looms.
3. Millinocket..._____	3. Cotton cloth.
4. Waltham....._____	4. Fish.
5. Fall River...._____	5. Paper.

Form Four.

Fill in the blanks in the sentences from the following list. Use each word once only.

Words.

1. Watches. 2. Looms. 3. Cotton cloth. 4. Fish. 5. Paper.

Sentences.

1. New Bedford is known for its _____.
2. Worcester is known for its _____.
3. Boston is known for its _____.
4. Holyoke is known for its _____.
5. Waltham is known for its _____.

The selection of the best or correct statements. The pupil may be asked to select from a list of statements, those which help to explain a situation. His degree of success in recognizing the appropriate statements will indicate his achievement. If a pupil is asked to write on a topic, the possible responses are many. If he is asked to select the correct statements, his reactions admit of definite measurement.

Form One.

The right-wrong, true-false, or plus-minus test involves the recognition of statements that are entirely true and statements that are in part false

Write the word "true" before each statement that is entirely true and the word "false" before each statement that is not wholly true.

_____ 1. Cape Cod is a high, rocky cape.

_____ 2. The growing season of New England is two months longer in the northern part than in the southern part.

_____ 3. The Merrimac turns more spindles than any other river of New England.

_____ 4. Tobacco is a well-known crop of the Boston Basin.

_____ 5. New England uses more water power than power derived from coal.

_____ 6. Fall River is known for its manufacture of cotton cloth.

_____ 7. Barre is known for the quarrying of granite.
_____ 8. Quincy is known for its quarrying of granite.
_____ 9. Haverhill is known for its manufacture of shoes.
_____ 10. The Penobscot River is the longest river of New England.

Instead of the words "true" and "false," the words "right" and "wrong" may be used. The signs for plus and minus may also be used. The advantage of the words lies in the difficulty of changing the decision later on, when the pupils may be helping to correct the papers, or after the papers have been graded by the teacher and returned to the pupils. More time for mechanical work is required than when the positive and negative signs are used. The pupil may be asked merely to indicate the true statements. He may indicate each true statement by placing a cross before it, by placing a circle around each number, by underlining the number of the statement or even the whole statement, or by writing the word "true" or "right" before each statement that he believes is true.

Form Two.

A test, consisting of questions, each question followed by several answers, may be constructed. The pupil may be asked to check the correct or best answer to each question.

Place a cross before the one best answer to the following question:

1. Why does New England depend dominantly on manufacturing?
   (1) There is an abundance of coal in New England.
   (2) New England has valuable metals for manufacturing.

(3) New England has a large number of skilled workmen.
(4) New England depends primarily on water power.

Form Three.

A question may be followed by a number of statements. Only a certain number of the statements should help to meet the conditions of the question raised. The pupil is asked to check the statements which help to answer the question. He may be left to decide for himself how many statements to check, or he may be told that he should check a certain number.

Place a cross before the three best answers to the following question:

1. Why is the fishing industry concentrated at Boston?
   (1) Most of the fish are caught in the water around Boston.
   (2) Boston has the best facilities for distributing fish to markets.
   (3) Boston has a better harbor to receive the large fishing schooners.
   (4) The people of Boston are heavy consumers of fish.
   (5) Capital for fishing enterprises can be more readily secured in Boston.
   (6) Boston has the advantage of an earlier start in the fishing industry.

Form Four.

A list of characteristics concerning a class of things may be given and the pupil may be asked to select those characteristics that apply to a particular member of the class. For example, various characteristics of coast-lines may be listed, and the pupil may be asked to check the various coastal characteristics that may be applied to the New England coast, the South Atlantic coast, etc.

Characteristics of coastlines.

1. The coastline is very irregular.
2. The coastline is regular.
3. There are numerous islands off the coast.
4. There are no islands off the coast.
5. There are many harbors.
6. There are few good harbors.
7. There are many rocky headlands.
8. There are few rocky headlands.
9. The tide covers wide areas of the coastal plain.
10. The coast is so high that the tide does not cover large areas.
11. Most of the rivers are tidal in their lower courses.
12. The rivers are not tidal in their lower courses.
13. A hilly area has subsided.
14. A peneplain area has subsided.
15. A continental glacier helped to deepen the reëntrants of water.

Indicate, by listing the numbers, the characteristics of coastlines that help to describe and explain the coastline of Maine._____

The characteristics may be listed after the question and the pupil may be asked merely to check the statements that he thinks apply.

Form Five.

A question may be given and followed by several paragraphs which discuss the question raised. All the paragraphs should contain true statements, but only one of the paragraphs should be sound throughout. At least one of the paragraphs should be undoubtedly the best discussion of the question:

Place a cross before the best paragraph discussion on the following question:

1. Discuss the surface of New England.

_____(1) New England has a hilly lowland along the coast and a hilly upland away from the coast. There are mountains in the west and north. The highest elevations are in the northern states. The large rivers, in general, flow southward. They have many waterfalls and rapids. There are many lakes and swamps. The coastline, in general, is rough and uneven.

_____(2) New England has a smooth coastal plain but a hilly upland away from the coast. Some parts are mountainous. The highest mountains are in New Hampshire. The streams, in general, flow eastward. New England is a well-drained region. The streams have many fine waterfalls. The coastline is hilly and uneven.

_____(3) Except where there are mountains, New England is not a very hilly region. The coastline, however, is hilly and uneven. Much of New England, especially the southern part, has very poor drainage. There are many waterfalls and rapids in the mountains. Elsewhere, the rivers are, for the most part, navigable. The important rivers, in general, flow southward.

Language aids. Various devices to supplement language tests may be used. These devices include the use of pictures, diagrams, statistical tables, and maps.

Pictures. Pictures, showing successive steps in a series of changes, may be placed on the bulletin board or given to the pupil. Each picture should have no identifying language but should be identified by a number. The pupil is asked to rearrange the pictures in sequential order and to indicate the dominant activity shown in each picture. Pictures, typical of scenes along a transportation route, may be placed before the pupil, and the pupil may be asked to rearrange the pictures in the order in which the scenes will appear in making the journey.

Pictures of coast scenes may be miscellaneously mixed together. The pupil may be asked to select the pictures which are typical scenes along the coast of Maine. Pictures dealing with industries may be placed before the pupil. He may be asked to select the five best pictures that are characteristic of important industries of New England.

One picture may be given the pupil and he may be asked to answer a list of definite questions through his study of the picture.

Graphic devices. Bars may be used to show the standing of the leading countries in the production of cotton. The pupil may be asked to write the name of the proper country opposite the longest bar, or any number of bars desired. A wheel may be used to show the exports of the country of Japan. The pupil may be asked to indicate the product that is represented by the largest part of the wheel, or as many of the segments as seems desirable. A graph may be made to show the annual distribution of rainfall in New England, in the Great Plains, and in southern California. The pupil may be asked to indicate the line which shows the typical annual distribution of each region. A square inch, standing for a square mile, may be used to show the average density of population for Rhode Island. Similar squares may be used to show the density of population for other selected states. The pupil may be asked to place the proper states opposite the proper squares. Varying degrees of assistance can be given the pupil in these tests. In some instances, names of countries, states, or regions, from which selections are to be made, should be given.

Statistical tables. Maps of continents, of countries, of physical regions, and of states, may be selected for pupils to identify. The pupils may be required to show the distributions of physical features, countries, cities, products, etc., on outline maps. The names may be written in the appropriate places, or the names may be written in a column and numbered and the numbers appropriately shown on the map. The distribution of physical and cultural features may be shown on an outline map by numbers. The pupil may be asked to write the numbers in a column, and write the name of the appropriate physical or cultural feature as represented by each of the numbers on the map. This device requires the giving of the numbers in each class to the pupil. For example, 1–10, mountains and highlands; 11–20, rivers; 20–25, lakes; 25–28, capes; 29–30, islands; 31–35, coastal waters; 36–50, cities. If the numbers in each class are given, the pupil will not confuse the numbers which stand for rivers and cities, states and mountains, etc.

The distribution of products, shown by a pupil on an outline map, permits considerable freedom of location. The pupil's knowledge of exact location of the distribution of products may be determined by placing rectangles in appropriate positions on the map. In each of the rectangles, the pupil may be asked to write the name of the product that is important in that region. Suppose an outline map of South America has been given the student. Five rectangles may be appropriately placed on the map to show the location of nitrate deposits, rubber trees, wheat fields, emerald mines, and coal fields. The pupil is

asked to write, in each rectangle, the appropriate product for that region.

In this chapter, the practicability of constructing tests that can be measured objectively has been shown. The teacher should show her resourcefulness by constructing such tests in accordance with the work that has been attempted. The same principles and devices that will permit the teacher to make tests to fit her immediate needs may also be used in the construction of tests to be standardized.

Some phases of geography, especially place locations, permit the use of tests that involve unassisted-memory recall. Achievement in the field of factual and problem geography frequently can be measured most certainly through tests that involve assisted-memory recall. The particular nature of the mechanical structure of the test is determined by the purpose to be realized through the test.

CHAPTER SIX

Place-Geography Tests

Scope of place tests. Place tests should include (1) the location of the leading countries and major adjoining water bodies, (2) the relative location of physical features and political areas, (3) the location of cities with reference to political areas, and (4) the location of cities with reference to physical features.

There are numerous other possibilities of location, as the location of physical features with reference to larger physical areas, the location of cities with reference to other cities, the position of countries with reference to other countries, etc. The broad requirements of location for elementary work, however, are met in the fourfold division indicated in the preceding paragraph.

Number of place tests. The listing of place names according to desirable criteria furnishes a study list. The criteria also assist in determining the relative importance of the places. A test may include only a part of the names included in a study list. Duplicate tests may be provided according to the number of place names that it is desirable to include in one test, and according to the total number of place names included in the study list.

The place names may be included in tests according to two different plans. (1) An attempt may be made to

make the place tests of the same degree of difficulty according to the varying importance of place names or according to the degree of difficulty experienced in remembering the various place names. (2) Tests, which successively contain names of decreasing significance, may be constructed. The first test includes the most important names, the second test the next most important names, etc.

Probably the most significant tests, in determining achievement and in distributing the members of a class, include samples of the more important and also of the less important things included in the study list.

Relation of study lists to place tests. The study list of place names should not be used as a drill exercise. Place names should be taught incidentally in connection with organizing centers that require their use. In a review exercise, the place names may be reviewed in relation to facts which make the places important. A place test, based on a systematic drill of the places included in the test, will give padded results.

Types of place tests. Various sorts of tests may be devised to determine the pupil's degree of mastery of place material. These tests may involve (1) the assistance of memory in recall by listing the correct answers with incorrect answers, and (2) unassisted-memory recall.

Assisted-memory recall. Place tests applied to South America.

Test One. The location of countries and adjoining water bodies.

1. Underline the country that is crossed by the equator.
   (1) Venezuela. (2) Brazil. (3) Argentina. (4) Chile. (5) Peru.

2. Underline the country that has the most land in the cool temperate belt.
   (1) Uruguay. (2) Chile. (3) Bolivia. (4) Brazil. (5) Argentina.
3. Underline the country that extends farthest south.
   (1) Chile. (2) Argentina. (3) Colombia. (4) Brazil. (5) Peru.
4. Underline the ocean that is west of South America.
   (1) Pacific. (2) Atlantic. (3) Indian. (4) Arctic. (5) Antarctic.
5. Underline the ocean that is east of South America.
   (1) Pacific. (2) Atlantic. (3) Indian. (4) Arctic. (5) Antarctic.

Test Two. The political location of physical features.

1. Underline the location of the mouth of the Amazon River.
   (1) Venezuela. (2) Brazil. (3) Argentina. (4) Colombia. (5) Uruguay.
2. Underline the location of the Strait of Magellan.
   (1) Brazil. (2) Peru. (3) Colombia. (4) Chile. (5) Bolivia.
3. Underline the location of Lake Titicaca.
   (1) Colombia. (2) Chile. (3) Bolivia. (4) Brazil. (5) Argentina.
4. Underline the location of Mount Aconcagua.
   (1) Chile. (2) Argentina. (3) Ecuador. (4) Colombia. (5) Bolivia.
5. Underline the location of Cape Horn.
   (1) Argentina. (2) Brazil. (3) Venezuela. (4) Peru. (5) Chile.

Test Three. The political location of cities.

1. Underline the location of Sao Salvador (Bahia).
   (1) Argentina. (2) Chile. (3) Uruguay. (4) Brazil. (5) Colombia.

2. Underline the location of Georgetown.
   (1) Venezuela. (2) British Guiana. (3) Argentina. (4) Peru. (5) Ecuador.
3. Underline the location of Callao.
   (1) Colombia. (2) Ecuador. (3) Peru. (4) Chile. (5) Venezuela.
4. Underline the location of Cordoba.
   (1) Bolivia. (2) Chile. (3) Brazil. (4) Venezuela. (5) Argentina.
5. Underline the location of Antofagasta.
   (1) Peru. (2) Ecuador. (3) Colombia. (4) Chile. (5) Argentina.

Test Four. The physical location of cities.

1. Underline the location of Sao Paulo.
   (1) Plateau of Bolivia. (2) Bogota plateau. (3) Guiana highlands. (4) Brazilian highlands. (5) Magdalena River.
2. Underline the location of Rosario.
   (1) Amazon River. (2) Parana River. (3) Orinoco River. (4) Negro River. (5) Magdalena River.
3. Underline the location of Barranquilla.
   (1) Plata River. (2) Amazon River. (3) Magdalena River. (4) Parana River. (5) Plateau of Bolivia.
4. Underline the location of Belem (Para).
   (1) Magdalena River. (2) Orinoco River. (3) Amazon River. (4) Parana River. (5) Strait of Magellan.
5. Underline the location of Recife (Pernambuco).
   (1) Pacific Ocean. (2) Atlantic Ocean. (3) Caribbean Sea. (4) Strait of Magellan. (5) Amazon River.

Five answers, four of which are wrong, are included after each question. As an average, the pupil will be able to underline the right answer, as a pure guess, only one time in five. The guess factor, for practical purposes, has been eliminated.

The pupil is asked to select the right answer from among a number of answers. Emphasis is placed on positive selection. The pupil selects the right answer, not because he knows that four of the answers are wrong, but because he knows that the one answer is right. His memory is assisted to recognize the correct answer immediately, if he really knows the correct answer. Pupils may know an answer but may not be able immediately to recall it. The assisted-memory-recall test conserves the time of the pupil because of the rapidity with which he can pass from question to question. It also helps a pupil more fairly to express himself because of the virtual elimination of the accidents of recall. A pupil, after taking such a test, will not say that he knew that Callao is in Peru but could not, for the moment, think of Peru.

Distribution of grades. If the assisted-memory-recall test involves only those place names that have been especially stressed in teaching, followed by special drill work, the grades of the pupils may be distributed on the basis of an inverted cone, most of the pupils being in the highest five, and a steadily decreasing number in each succeeding lower five. This distribution of grades especially will prevail if the pupils with the poorest memories have sacrificed by spending the additional time necessary to master the list. If the teacher has controlled the time that the pupils have spent on South American place names, and if this time has been just sufficient to enable the child with the best memory to master the place names, then the normal distribution curve will tend to prevail.

If the place test includes both places that have been

stressed and places that the pupils have had an incidental contact with, the pupils, even though they have spent a different amount of time in preparation, will be distributed more nearly according to the normal distribution curve. The test which includes only those things that have been stressed emphasizes social needs; the test which includes both the more important and the less important places emphasizes individual differences.

Scores. The scores which a class will make on an assisted-memory test depend largely on the way the geography of the region is taught. The fact that test three, "The political location of cities," nearly always ranks the highest, and test four, "The physical location of cities," nearly always ranks the lowest, indicates that interpretations of physical influences are commonly omitted.

Comparisons of scores of representative classes. The following table of scores shows achievement in three classes as determined by the above place test on South America. The study periods and recitation periods were practically the same in each case. Class A was taught by a teacher who did not have any particular interest in geography; Class B was taught by an earnest teacher who was accustomed to factual geography plus drills; Class C was taught by a well-prepared teacher who was enthusiastic over interpretative geography.

Class A. Indifferent teacher. 22 pupils.

Upper third median	15.2	points
Middle third median	12.3	"
Lower third median	10.1	"

Class B. Teacher depended on facts and drills. 34 pupils.

Upper third median	18.4	points
Middle third median	17.2	"
Lower third median	15.3	"

Class C. Teacher stressed interpretations. 36 pupils.

Upper third median	17.1	points
Middle third median	15.1	"
Lower third median	13.0	"

Each teacher was aware of the nature of the test, and expected the test to be given at the completion of the study of South America. The importance of enthusiastic and well-prepared teachers is indicated by the fact that the pupils in Class B and Class C show a much higher achievement than the pupils of Class A. In so far as immediate recall is concerned, the teacher who depended on facts and drills secured better results than the teacher who stressed places incidentally in relation to problems. Through drill work the teacher of Class B was able to raise the achievement of the lower third so that the median for the lower third is only three points lower than the median for the upper third. The teacher of Class C, on the other hand, made no special effort to drill on place names with the result that the median for the lower third is four points lower than the median for the upper third.

Before the interpretative method of teaching geography is condemned, however, another factor, the factor of remote retention, must be considered. After all, immediate retention is not nearly so significant as permanent retention. The papers were graded without any comment and corrections which would reënforce the memories concern-

ing the material. Ten weeks later the same test was given with the following results:

Class A. Indifferent teacher. 19 pupils.

Upper third median	12.1	points
Middle third median	7.5	"
Lower third median	10.2	"

Class B. Teacher depended on facts and drills. 30 pupils.

Upper third median	13.0	points
Middle third median	10.2	"
Lower third median	8.5	"

Class C. Teacher stressed interpretations. 31 pupils.

Upper third median	15.3	points
Middle third median	13.3	"
Lower third median	9.5	"

The superiority of the problem method is seen in a higher degree of remote retention by Class C than by Class B. The place material had been clinched by relating it in an intimate way with meaningful discussions. In all three tests, the range of achievement was greater the second time the test was given. Native differences probably were measured more accurately in the second attempt. Both tests, given to Class A, probably show considerable range of scores because the pupils were left to their own initiative to a considerable extent. The range in scores, both times, was greater in Class C than in Class B. This probably means that work taught on a problem level differentiates pupils to a greater extent because of native differences than does work that is taught dominantly on a memory level.

Outline maps and memory recall. An outline map containing the class symbols (closed lines for rivers, dots for

cities, etc.) for the various places to be recalled may be placed in the hands of the pupil. The test on South America may then be given the pupil and with the help of the map he may be asked to underline the answers that he thinks are correct. In this case, a somewhat higher median achievement may be expected. Or, no answers may be given, but the pupil may be asked to give the right answer to each of the questions with the help of the reference map. In the latter case, a somewhat lower median achievement may be expected than in the former case. A map is desirable if the pupil has not built up clear-cut images of the region. On the other hand, an attempt should be made to build up vivid, accurate images of the regions that are being studied.

Unassisted-memory recall. The pupil may be asked to locate places without any assistance whatever. The ability to recall, without assistance, involves a more secure retention of facts than memory recall that is assisted by a choice of answers. The assisted-memory-recall test does not distinguish between pupils who need assistance and those who can answer the questions just as readily without a choice of answers. A wider range of median achievement may be expected if the memory is not assisted.

Unassisted-memory recall. Place tests applied to South America.

TEST ONE. *The location of countries and adjoining water bodies.*

1. Name the country that has the largest area near the equator. _____

2. Name the country that has the most land in the cool temperate belt. _____
3. Name the country that extends farthest south._____
4. Name the ocean that is west of South America._____
5. Name the ocean that is east of South America. _____

TEST TWO. *The political location of physical features.*

1. The mouth of the Amazon River is in what country? _____
2. The western entrance to the Strait of Magellan is in what country? _____
3. The eastern end of Lake Titicaca is in what country? _____
4. Mount Aconcagua is in what country? _____
5. Cape Horn is in what country? _____

TEST THREE. *The political location of cities.*

1. In what country is Sao Salvador (Bahia)? _____
2. In what country is Georgetown? _____
3. In what country is Callao? _____
4. In what country is Cordoba? _____
5. In what country is Antofagasta? _____

TEST FOUR. *The physical location of cities.*

1. In what highlands is Sao Paulo located? _____
2. Rosario is on what river? _____
3. Barranquilla is on what river? _____
4. Belem (Para) is on what river? _____
5. Recife (Pernambuco) is on what body of water? _____

In the assisted-memory test, involving a choice of answers, the answers can be controlled so that only one of the answers will be right. For example, the Strait of Magellan is both in Argentina and in Chile. If only one of these countries is included in the five answers, there is

only one right answer. If the pupil is asked to name a country that is crossed by the equator, he has his choice of three countries, Brazil, Colombia, and Ecuador. If only one of these countries is included in the five answers, there is only one right answer that can be selected. Increasing the number of answers to select from, decreases the possibility of selecting the right answer through a fortunate guess. If more than one answer is right, the difficulties of grading are correspondingly increased.

The unassisted-memory test exercises no control over the answer through choice of answers. The only control is through the question itself. The question should be worded so carefully that only one correct response is possible. The question, "What country is crossed by the equator?" may be changed to "What country has the most land near the equator?" The question, "The Strait of Magellan is in what country?" may be changed to "What country controls the western entrance to the Strait of Magellan?" If only one answer is possible, guessing is reduced and the grading of papers is facilitated.

It should not be assumed that the guessing element disappears when the pupil is not assisted by being given a choice of answers. The pupil, for example, may not be sure of the location of Mount Aconcagua. He knows, however, that the Andes Mountains are near the Pacific Coast, and extend north and south through a number of countries. He knows the highest peaks of South America are in the Andes Mountains. He may recall Ecuador, Peru, Bolivia, Chile, and Argentina as possibilities. He may be uncertain of the political location of Aconcagua,

but finally on a chance may put down Argentina. The chance of his guessing right, under such conditions, is correspondingly diminished as the number of possible countries to select from increases through memory recall. Whether the pupil is assisted through choice of answers, or whether the pupil assists himself by recalling several answers to select from, the guess factor enters in if the pupil is not sure of the right answer.

Scores. A comparison of the unassisted-memory test with the assisted-memory test, dealing with the same area and the same facts, is possible if the unassisted-memory test is given first. The two tests on South America were given, resulting in scores as follows:

Assisted-memory recall.	*Unassisted-memory recall.*
Upper third median....16.2	Upper third median.....15.0
Middle third median....12.5	Middle third median....11.1
Lower third median....10.1	Lower third median..... 8.2

A comparison of the two tests shows that the medians were somewhat higher in the test that included a choice of answers. The difference in indicated achievement was slightly greater with the lower third group than with the upper third group. These facts would seem to indicate that the upper third benefits less from assisted memory recall than the lower third. There was practically no change in the relative rank of members of the class. In the assisted-memory-recall test the difference in medians between the upper third and the lower third is only six points; in the unassisted-memory-recall test, the difference in spread is slightly more, or seven points. The assisted-memory test, in raising the relative achievement of the

lower third, probably more nearly shows the true distribution.

Other forms of the unassisted-memory test. The pupil may take an outline map of South America and indicate the names and locations of physical places, countries, and cities. If writing the names on the map will crowd the map too much, a number scheme may be used. Thus numbers 1 through 5 may stand for countries, numbers 6 through 10 may stand for cities, etc. A definite list of countries, cities, and physical features may be given, the corresponding number for each place to be shown on the map by the pupil.

The pupil, in addition, may be asked to draw a sketch map of South America, and to insert on the outline map the locations named.

The chief disadvantage of the map test is the large amount of time consumed by the teacher in grading the papers. Preferably the outline map should be used as a work map on which the pupil, from day to day, as place names arise, will indicate the place locations. Thus, at the completion of a study of South America, the pupil will have a relatively complete map of South America that has been built up on the basis of need.

Conclusions. 1. Outline maps, involving place locations, should be used from day to day as places are mentioned in connection with vital organizing centers. The chief objection to their use in completion tests is the increased difficulty involved in checking results.

2. The assisted-memory place test is economical of the time of the pupil, especially the slower members of the

class. This type of test, in a limited time, reveals more clearly the achievement of the class, especially the lower third group. The multiplication of answers from which to choose reduces the "guess factor."

3. The unassisted-memory place test, if the time is limited, is not a fair index of the achievement of the lower third group. The "guess factor" is not entirely eliminated in this type of test. The ability to withdraw from memory's storehouse the correct reaction, however, is important. This type of test measures the ability of the pupil to react subjectively to a challenge; the assisted-memory place test measures the ability of the pupil to react objectively to a challenge. While each type of reaction is important, the results secured are so nearly in accord that either type of test will give reasonably satisfactory results.

Degree of mastery of place names to be expected. The unassisted-memory place test is a fair index of the pupil's ability to recall and use place locations; the assisted-memory place test is a fair index of the pupil's ability to recognize in print and in lectures or discussions the place locations that are mentioned. Perhaps the latter type of achievement is more important than the former as an aim of the elementary schools. Fortunately, emphasis on one type of use does not eliminate the other type as a part of the child's mental equipment.

Criticism of the assisted-memory place test. What effect does the fact that the child is confronted with five answers, four of which are wrong, have on the child's training? The purpose of the test is not to form habituations but to test

habituations. The association of the right answer with the question should have been formed during the instruction and study periods. The teacher should make every attempt to prevent the child from making the wrong associations and to cause the child to make the right associations. If these associations have not been made, that is, if the child does not know the answer, he is aware that he is merely guessing. If the child is not guessing and gives the wrong answer, the weakness is not in the test but in the instruction that has preceded. A wrong answer, barring carelessness, indicates either that the child is guessing or that he has made the wrong associations.

Some teachers may desire to discourage the child from guessing if he does not feel sure of the right answer. In some instances, it is sufficient to ask the pupils to answer only the questions that they are sure of. In other instances, a penalty for wrong answers may be imposed. Each answer right may be counted one point; each question left unanswered will not be counted; and each answer that is wrong may involve the deduction of one point, or some fraction of a point sufficient to discourage guessing.

Frequently a pupil thinks that he is engaging in a pure guess, whereas his past experience has been of such a nature that he will select the right answer. He is not sure that the Pacific Ocean is west of South America, but is inclined to think that it is. In fact, there are all gradations from absolute certainty of the answer to absolute uncertainty.

Importance of place names. Geography deals with real situations concerning a real earth. To talk about

geographic topics without relating these topices to definite places is to leave the discussion "in the air." Definite places must be given names. The names of these places should be taught in connection with the topics that are discussed. The core of geography is centered about locations. Place names, therefore, are the vital framework of geography. All discussions hinge thereon. It is just as deplorable to discuss geographic topics without dealing specifically with the necessary place names as to drill on place names without a discussion of geographic relationships.

Quantity tests. A rightly devised test should involve a maximum of mental activity and a minimum of mere clerical work. It is impossible, in group testing, to eliminate the mechanical activities. The assisted-memory test involves merely the drawing of straight lines; the unassisted-memory test involves the writing of words. A certain amount of the child's time is required merely in meeting the mechanical conditions of a test. This should be taken into consideration when a time test is involved. There is also a difference in the ability of children to read and to grasp the thought.

The time test is helpful in causing the pupils to concentrate on the work to be done. When a pupil has unlimited time, he frequently tends to dillydally. Even in a quality test a reasonable time limit should be imposed. In a time test, a sufficient amount of material should be included to keep the best pupil busy during the entire time. For example, the pupils of a class may be given five minutes in which to answer all the questions they can

in the list dealing with South America. In general, the best pupils tend to answer the most questions correctly, but occasionally a good but slow pupil makes a poor showing in a quantity and quality test. Since the world is asking of its workers not only how accurately a task can be done, but how much can be done in a given time, it is desirable to check pupils through both quantity and quality tests. Both speed and accuracy should be checked through the use of tests.

CHAPTER SEVEN

Factual Geography Tests

Importance of factual tests. A knowledge of the location of places is factual knowledge. This sort of knowledge, however, as has been pointed out, is fundamental in all geographic discussions. Geography deals with distributions. A mere knowledge of place locations is not of much value. Vital facts should be associated with places. A place is worth remembering to the extent that life activities and adjustments are related thereto.

The number of facts of geography is innumerable. Those facts of most worth should be stressed in the elementary schools. Not merely interesting facts about a region, but facts that are of importance to mankind should be stressed.

Scope of factual tests. The facts about places should include (1) facts about cities, (2) facts about countries and states, and (3) facts about the physical background, and human activities superimposed thereon.

Facts about cities may include (1) capitals of the more important countries or states, (2) the recognition of the larger cities, and (3) the leadership of cities in certain products, industries, or other important characteristics. The viewpoint may be taken that those capitals that serve the most people are, in general, the most important.

Similarly, the largest cities, irrespective of political or physical location, provide a livelihood for the largest number of people and may be considered most important.

Reliable statistics concerning the relative importance of cities as commercial and industrial centers are not easily secured. For example, one source states that Chicago is the largest lumber center of the United States, another source states that Buffalo holds this position, while the wholesale dealers' association of St. Louis is certain that St. Louis is the largest lumber center. Moreover, almost every city of moment has such diversified industries that each city is important in the production of many different things. New industries are constantly being established.

The question, "Which city of South America is best known for its exportation of nitrates?" may be given. In many books the answer, Iquique, is found, but other books name Antofagasta. The difference may be due to the use of different years in studying the statistics of export of nitrates. Whatever the reason for the difference, if the sources of information available give different answers, there is bound to be difficulty in grading the test fairly. On the other hand, if the question is raised, "What is the most important exported product of Iquique?" there is general agreement that nitrate is the most important. After experimenting, it was found that the leadership of cities can be worked out more satisfactorily if a city, well known for a certain product, is named, and the pupil asked to identify this product.

Examples.

1. Underline the product for which Iquique is best known.
   (1) Coffee. (2) Coal. (3) Tin. (4) Nitrates. (5) Wheat.
2. Underline the product for which Santos is best known.
   (1) Cacao beans. (2) Coffee. (3) Wheat. (4) Nitrates.
   (5) Copper.

Leadership of states or countries. Geography stresses countries and regions that are important sources of products. The statistics dealing with the production of states and countries, in contrast to those dealing with the production of cities, are more frequently in agreement as to the relative importance of regions. It is practicable, therefore, to list the product and ask the pupil to identify the country that is preëminently important in the production or exportation of the product. The pupil identifies the product that is closely related to a particular city; the pupil identifies the state or country that is closely related to a particular product.

Examples.

1. Underline the country that leads in the production of coffee.
   (1) Argentina. (2) Brazil. (3) Chile. (4) Colombia. (5) Venezuela.
2. Underline the country that leads in the production of nitrate.
   (1) Argentina. (2) Brazil. (3) Chile. (4) Bolivia. (5) Peru.

Facts about regions. A classification of the facts of geography, as discussed in the various textbooks, involves the following topics: (1) relief and soils, (2) climate, (3) agriculture, (4) pastoral activities, (5) mining, (6) the forests, (7) fishing and hunting, (8) manufacturing, (9) transportation, (10) relations with other regions, (11) social and political conditions.

The pupil's degree of mastery of the facts may be tested by selecting sample representative facts from each of the topics of importance in the region. The facts may be stated in the form of declarative statements. Some of the statements may be true statements; some of the statements may be incorrect. The pupil may be asked to indicate the statements that are true.

Suppose that ten statements, concerning which the pupil is asked to express judgment, have been listed. As an average, the pupil will, according to hypothesis, guess one-half the statements correctly even though he has no knowledge of the facts. He therefore starts with an average grade of 50%. The rule has been formulated that, in grading the test paper, the sum of the answers wrong should be subtracted from the sum of the answers right. In practice, this rule seems to impose too heavy a penalty on the student. Average conditions cannot be applied fairly to a particular student. The grades are affected by the carelessness of some students and the cautiousness of other students.

The pupil may be given ten statements. He may be told that only five of the statements are correct. He is asked to select the five correct statements. Emphasis is not placed on the wrong statements but on the correct statements. The pupil's attention is concentrated on statements that he believes are correct. His strongest associations are being made with the statements he believes to be correct. After the pupil has selected five statements, there are still five statements left. The guess factor, therefore, has been reduced to a negligible quantity. The

pupil is given one point for each statement that he selects correctly. In grading, no attention is paid to the incorrect statements. If the pupil disregards instructions and marks more than five statements, an additional point is deducted for each statement exceeding five that he marks.

Factual tests (assisted-memory recall). The unassisted-memory-recall test can be used in dealing with capitals and largest cities. If applied to the leadership of cities, states, and countries, or to statements about a region, however, in many instances several different answers can be given, each of which may be wholly or partially incorrect. It seems best, therefore, to use the assisted-memory-recall test in dealing with facts about a region.

Factual tests applied to South America.

TEST ONE. *Capitals and largest cities.*

1. Underline the capital of Brazil.
   (1) Belem (Para). (2) Rio de Janeiro. (3) Santos. (4) Recife. (5) Sao Salvador.
2. Underline the capital of Argentina.
   (1) Rosario. (2) Para. (3) Tucuman. (4) Buenos Aires. (5) Mendoza.
3. Underline the largest city of Chile.
   (1) Santiago. (2) Valparaiso. (3) Iquique. (4) Antofagasta. (5) Valdivia.
4. Underline the largest city of Uruguay.
   (1) Asuncion. (2) Montevideo. (3) Paysandu. (4) Cordoba. (5) La Paz.
5. Underline the largest city of Peru.
   (1) Callao. (2) Mollendo. (3) Pasco. (4) Arequipa. (5) Lima.

TEST TWO. *The leadership of cities.*

1. Underline the product for which Guayaquil is best known.
   (1) Nitrates. (2) Coal. (3) Cacao beans. (4) Coffee. (5) Wheat.
2. Underline the product for which Santos is best known.
   (1) Cacao beans. (2) Coffee. (3) Wheat. (4) Copper. (5) Tin.
3. Underline the product for which Belem (Para) is best known.
   (1) Coffee. (2) Platinum. (3) Nitrates. (4) Rubber. (5) Wheat.
4. Underline the product for which Antofagasta is best known.
   (1) Coal. (2) Iron ore. (3) Nitrates. (4) Rubber. (5) Coffee.
5. Underline the product for which Rosario is best known.
   (1) Copper. (2) Tin. (3) Coffee. (4) Wheat. (5) Paraguay tea.

TEST THREE. *The leadership of countries.*

1. Underline the country that leads in the production of nitrates.
   (1) Chile. (2) Bolivia. (3) Peru. (4) Ecuador. (5) Colombia.
2. Underline the country that leads in wheat exports.
   (1) Brazil. (2) Uruguay. (3) Argentina. (4) Chile. (5) Peru.
3. Underline the country that leads in the production of coffee.
   (1) Colombia. (2) Venezuela. (3) Ecuador. (4) Peru. (5) Brazil.
4. Underline the country that leads in the production of rubber.
   (1) Venezuela. (2) Colombia. (3) Brazil. (4) Ecuador. (5) Bolivia.
5. Underline the country that leads in iron ore deposits.
   (1) Chile. (2) Argentina. (3) Brazil. (4) Bolivia. (5) Peru.

TEST FOUR. *Statements about South America.*

Five of the following statements are true; five of the following statements are not true. Place a cross before each statement that is true.

_____ 1. Mount Aconcagua is the highest mountain peak of South America.

_____ 2. Coffee is the leading product of the Amazon lowlands.

_____ 3. Animal products are the most valuable export of Chile.

_____ 4. Nitrate is the most valuable mineral export of Bolivia.

_____ 5. The pampas of Argentina consist chiefly of grasslands.

_____ 6. Argentina, with abundant coal fields, should become very important in manufacturing.

_____ 7. Railroads are used to transport most of the rubber of the Amazon Basin to seaports.

_____ 8. Brazil exports more products to the United States than to any other country.

_____ 9. English is the prevailing language in most of the countries of South America.

_____ 10. The northern part of Chile is a desert.

There are twenty possible points in the above tests. While it is not impossible for a pupil to score twenty points, unless he has been drilled specifically on the test such a result is highly improbable. The following median scores were made by 123 pupils of the seventh grade who had just completed the study of South America.

Median upper third.....15.8 points
Median middle third.....12.4 "
Median lower third.....10.0 "

Improvement in teaching. The median scores of classes are almost invariably raised after the pupils have been tested and the teacher is aware of the nature of the tests. In some instances this may be due to the fact that the teacher attempts to find a short cut to success by drilling the pupils according to the test material. In most instances, the improvement is due to the fact that the teacher, through the tests, is stimulated to select and organize her material more effectively because of the definite outcomes which the tests require.

Diversity of facts. The factual tests involve a greater variety of material than the place tests. It is more difficult for the pupils to prepare themselves assuredly for the tests. Greater diversity of reaction may be expected from those taking the tests. On the other hand, if the tests have been devised with the more fundamental factual material in mind, the range of achievement should be similar to that for the place tests.

Duplicate tests. A test that is given repeatedly may have a bad effect if it includes only a part of the facts that may be considered fundamental. The teacher will tend to stress those things that are stressed in the tests. Tests, to be sure, are not standards, but they help to determine the standards that the teacher will hold in mind. It is desirable, therefore, that duplicate tests, covering practically the whole of the essential facts, shall be provided. A more general and impartial emphasis on all the fundamental facts will thus be secured.

Correct or best answer test. The topics of a country that has been discussed may be listed. A knowledge of

the facts of each topic may be tested by the paragraph device. Four, or some other number of paragraphs, may be written about each topic. One of the paragraphs should contain accurate statements throughout. The other paragraphs should contain a mixture of true and false statements. The pupil is asked to indicate the best paragraph.

Application to the country of Brazil. The following topics are considered in the paragraph test: (1) surface features, (2) climate, (3) agricultural and pastoral activities, (4) mining, (5) the forests, (6) manufacturing, (7) transportation, (8) people, (9) relations with other countries.

Place a cross in front of the correct or best discussion of each of the nine topics.

1. Discuss the surface features of Brazil.

(1) The Guiana highlands extend a short distance into the northern part of Brazil. The Brazilian highlands are in the southern part and near the Atlantic Ocean. Between these highlands is the Amazon River, the largest river in the world.

(2) The Amazon River basin is a great lowland, extending from the Andes Mountains to the Atlantic Ocean. To the north are the Brazilian highlands, with a steep slope toward the ocean and a long, gentle slope inland. To the south are the Guiana highlands, with a steep slope inland, and a long, gentle slope toward the ocean.

(3) The Brazil highlands are in the southern part of Brazil. They have a long, gentle slope toward the ocean, and a steep slope inland. The Guiana highlands extend into northern Brazil. They have a long, gentle slope toward the sea, and a steep slope inland. Between the two highlands is the lowland of the Amazon Basin.

(4) The Amazon Basin occupies the northern part of Brazil. The Amazon rises within 100 miles of the Pacific Ocean, but flows 3500 miles westward into the Atlantic Ocean. To the south of the Amazon lowlands are the Brazilian and Guiana highlands.

2. Discuss the climate of Brazil.

(1) Much of Brazil has a hot, wet climate. During the rainy season, large parts of the Amazon lowlands are flooded. The insects, the dense tropical forests, and the hot, wet weather make it hard for people to live here. In the uplands of southern Brazil, some distance from the equator, the climate is more favorable to man.

(2) The Amazon Basin has hot, rainy summers. The winters are cool and dry. The tropical forests line the banks of the streams. Away from the streams are the grasslands. Plants grow rapidly during the hot, rainy summers. Many people live here. Few people live in southern Brazil because the weather is too cool and dry for farming.

(3) Southern Brazil and northern Brazil have hot summers and cool winters. These regions are grasslands because of the light rainfall. Between these regions, in the tropical forests, the rainfall is heavy, and the weather is hot every month in the year.

(4) Southern Brazil and northern Brazil are hot and rainy. These regions are covered with tropical forests. Between these regions the light rainfall and warm weather give rise to tropical grasslands.

3. Discuss the farming and pastoral activities of Brazil.

(1) Cotton, sugar cane, and tobacco are grown on the coastal lowlands. Coffee is the chief crop of the long, gentle inland slopes of the Brazilian highlands. Stock-raising is important on the grasslands of southern Brazil. Only a few places in the Amazon lowlands are under cultivation.

(2) Large crops of sugar, cotton, and rice are produced in the hot, moist lowlands of the Amazon River. Stock-raising will probably always be the important industry of southern Brazil, for the climate is too hot and wet for wheat and corn. Coffee is produced in large quantities on the long, gentle, seaward slopes of the Brazilian highlands.

(3) Most of the coffee is grown in the Brazilian highlands, where there are abundant rains, fertile soils, and well-drained slopes facing the ocean. The cattle industry is located on the grassy lowlands of the Amazon. Cotton, rice, sugar, and tobacco are grown on the coastal lowlands. Products of the cool temperate belt are grown in southern Brazil.

(4) Coffee is the chief crop of the Amazon lowlands where the temperatures are high and the rainfall is heavy. Other important crops of this region are cotton, sugar, and tobacco. The uplands of southern Brazil are given over to stock-raising, for the land is rugged and the scanty rainfall is just sufficient to provide grasses.

4. Discuss mining activities in Brazil.

(1) A small amount of poor coal is mined in southern Brazil. Gold and diamonds are secured from the Brazilian highlands. Large deposits of iron ore have recently been discovered. This ore is now being carried by railroad to the coast. It is being sent to foreign countries.

(2) Large quantities of iron ore are sent down the Amazon River to Para, from which place it is exported to the United States. The diamond industry is most important in the Guiana highlands. Gold is mined in the Brazilian highlands. A poor grade of coal is mined in southern Brazil.

(3) In the same part of the Brazilian highlands have been found rich deposits of iron ore and thick veins of good coal. Diamonds and gold are secured from the Amazon lowlands. Brazil is the leading country of South America in the mining industry.

(4) Brazil is not very important in the production of minerals. Most of the gold, diamonds, and iron ore come from the Guiana highlands. Rich coal fields underlie the Amazon lowlands. The coal is carried in barges down the Amazon River. Rich deposits of copper and tin are found in the Brazilian highlands.

5. Discuss the forests of Brazil.

(1) The tropical forests of the Amazon Basin yield many products useful to man. These forests are the most important source of supply of the rubber of the world. The trees are found in groves and are nearly always close to a navigable tributary of the Amazon. Other important products are nuts, drugs, and cacao beans.

(2) The tropical forests yield large quantities of rubber, Brazil nuts, ivory nuts, drugs, and cacao beans. The world's chief supply of rubber now comes from southeast Asia and near-by islands. Rains, insects, diseases, and the dense growth of vegetation make it hard to get the products of the forests. Because of the floods, most of the products are secured during the dry season.

(3) The tropical forests are hard to travel through. It is expensive to get the products out of the swampy forests. As a result, many plantations have been established for the cultivating of the rubber tree, the cacao tree, the Brazil-nut tree, and other useful trees. Most of the forest products of the Amazon Basin are now secured from these plantations.

(4) A large part of Brazil is covered with forests. As a result, lumber is abundant and cheap in all parts of the country. Among the valuable products of the forest are Brazil nuts, cacao beans, manioc, rubber, and drugs. Most of these products are secured during the rainy season when the streams have much water for navigation.

6. Discuss manufacturing in Brazil.

(1) Brazil has not become very important as a manu-

facturing country. While there are large quantities of iron ore, not much coal has been discovered. There are large water power sites, but these have not been used.

(2) Brazil owed its early development to the products of the forest. The people came more and more to depend on farming. Recently they have developed much water power and opened up many coal mines. The abundant cheap power has led to manufacturing.

(3) In her attempts to encourage manufacturing, Brazil has not been very successful. Brazil lacks iron ore and coal. The country is so low that very little power can be secured from the numerous streams.

(4) Most of the manufacturing in Brazil is in the Amazon lowlands where cheap water power can be secured. There is no good coal near the cities of the coast, but even in these cities, manufacturing is becoming very important because coal can be shipped in cheaply from other countries.

7. Discuss transportation in Brazil.

(1) It has been possible to secure the products of the Amazon Basin because of the thousands of miles of navigable rivers. A railroad has been completed around the falls and rapids of the Madeira River. Most of the railroads are in the southern part of Brazil and extend back a short distance from the coast.

(2) The southern part of Brazil has no large navigable rivers leading to the ocean. The Amazon River, with its thousands of miles of navigable rivers, has invited settlement. There are only a few short railroad lines leading back from the cities of the coast. Most of the people of Brazil live along the navigable rivers of the Amazon Basin.

(3) Numerous short railroad lines have been built about the rapids of the Amazon River. The development of the Amazon Basin has been possible because of thousands of miles of navigable rivers and these short railroad lines. In

southern Brazil progress has been slower than in the Amazon Basin because of the lack of navigable rivers.

(4) The more progressive settlements in Brazil are along the navigable rivers. Brazil has a few short railroad lines, especially in the southern part. A railroad line extends from Para, at the mouth of the Amazon River, by way of Manaos, to Iquitos, 2500 miles from the mouth of the Amazon.

8. Discuss the people of Brazil.

(1) The Portuguese settled in large numbers in Brazil. They enslaved the Indians, and also brought in negroes as slaves. At a later period, many Italians settled in the coffee-growing district, and many Germans settled in southern Brazil. There are many people of mixed blood. Most of the people are in south Brazil and not far from the coast.

(2) The Spaniards settled in large numbers in Brazil. They made slaves of the Indians. It was not necessary to bring in negroes as slaves. There are important German settlements in the coffee-growing district. Many Italians have settled in the Amazon Basin. Spanish is the national language.

(3) The Portuguese took possession of Brazil at an early date. There were no Indians near the coast, so the Portuguese brought in negroes as slaves. Later, many Spaniards settled in Brazil, and many Germans settled in the coffee-growing district. The Spaniards now are the ruling class. There are many Indians and people of mixed blood.

(4) The Portuguese settled Brazil. They made the Indians slaves, and also brought in negroes as slaves from Africa. Many Italians have settled along the Amazon River. The Germans have settled in the Guiana highlands. Portuguese is the national language. Most of the people live in the Amazon Basin.

9. Discuss the relations of Brazil to other countries.

(1) A large part of Brazil is in the tropical regions. Brazil supplies an important part of the rubber of the world. She also exports more coffee than any other country. Brazil imports manufactured goods and machinery. The United States and western Europe are her best customers.

(2) The Amazon Basin of Brazil supplies most of the world's coffee. Large quantities of rubber are exported from the Amazon Basin. Brazilian imports are chiefly food of the cool temperate belt. Brazil sells more products to the United Kingdom than to any other country.

(3) Brazil's leading exports are cacao beans, bananas, and Brazil nuts. Rubber and coffee exports are becoming very important. Shipments of iron ore are being made to the United States. Brazil trades mostly with northwestern Europe.

(4) Brazil's leading exports are coffee and rubber. These products go mostly to Europe. Most of the imported goods come from the United States. Much Paraguay tea is exported to Argentina. Most of the exported products come from the Amazon Basin.

Advantages of the composition test. The paragraph test has the advantage of causing pupils to evaluate the details in composition form. Most of their studies and customary expression work are through related language forms. More time is required for a single reaction than in the simpler forms of tests. The measurable unit, being a paragraph, involves several facts and relations. The pupils may understand parts of the paragraphs and yet come to wrong conclusions. No credit can be given unless the pupil has marked the right paragraph. This test involves a large amount of mental activity in contrast to the

mechanical work required. The reading of four paragraphs merely requires mechanically the placing of a cross before the paragraph that the pupil believes is the correct or best discussion. The paragraph test may deal exclusively with facts about places and a description of relationships, or interpretations may also be given. The preferable method is to blend descriptions and interpretations. To the extent that this form of test is interpretative, its consideration might have been postponed for the ensuing chapter on "Problem Tests in Geography."

CHAPTER EIGHT

Problem Tests in Geography

Importance of problem tests. The problematic organization of material for instruction creates a need for the use of facts in meeting the conditions of the problem. New facts are accumulated to meet the conditions of the problem, while old facts, if appropriate, are used. The systematic relating of facts for the realization of a common purpose gives vividness and intensity of purpose to school work.

The factual test merely measures the ability of the pupil to recall or recognize certain facts without reference to use. The problem tests measure the ability of the pupil to comprehend and recognize the relationships that exist between facts and some problem that has been raised.

The ability to assimilate content on a memoriter level does not necessarily imply the ability to assimilate content on a problem level. The ability to use knowledge to meet life's conditions is more significant than the mere ability to accumulate knowledge. The capacity to think probably varies considerably according to inherited tendencies of the nervous system. The ability to memorize also varies, but ease of learning on a memoriter level can be supplemented to a certain extent by repetition of experience so

that pupils with a poor memory may be able to master the same number of minimum place names and facts that pupils with a better memory are able to master. That is, school work, based primarily on habituation, can be generally acquired by all normal pupils who can be induced to make the necessary intensive and repeated effort.

School work, based primarily on the ability to reason, cannot be so generally and equally mastered by all normal pupils. Problem solving, by its very nature, involves a succession of new challenges. The moment that a mastered problem is reviewed, the problem no longer remains a creative problem but has become organized memoriter material on a problem level. A problematic organization of material can be taught on a memoriter level, in which case it will be possible, through repetition, for the weaker students to appear to have mastered the problem exercise, as a problem, to the same extent that the better pupils have mastered it.

A discussion of a problem is very difficult to evaluate. For example, the pupil may be asked to explain "Why the Central Valley of Chile is the most densely populated part of Chile." There are many facts, with varying degrees of value, that help to explain the question raised. Other facts, as a matter of opinion, may be important or unimportant according to the viewpoint. Not only is one paper difficult to evaluate. Each pupil uses somewhat different facts, or uses the same facts in a somewhat different way, so that it is next to impossible to grade the papers relatively so as to be just to each pupil. The factors which may enter into the explanation may be analyzed and the value

of each part determined, but the number of measurable units involved, each of which may appear almost anywhere in the discussion, makes it next to impossible thus to evaluate the paper, except through the use of an unwarranted amount of time.

Requisites of a satisfactory problem test. A problem test, to be of much assistance, must be accurate and easily graded. From the teacher's standpoint, the test should be made up of measurable units that occur in a definite order so that grading will be facilitated. From the pupil's standpoint, the test should require the pupil to evaluate material that may have a bearing on the question raised. The pupil should show his ability to distinguish between good and poor answers, to distinguish between true and false reasons, and to distinguish true reasons from interesting facts about the topic. The unassisted-response test, in which the pupil writes in his own way about the problem, does not possess the desirable characteristics from the teacher's standpoint. The assisted-response test, through the control that it exercises on the pupil's channels of thought, may meet both the requirements of teacher and pupils.

Problem test applied to South America (assisted responses). A series of problem tests may consist of (1) a test which involves a recognition of the best answer among several answers; (2) a test which involves a separation of true reasons and true facts; (3) a test which involves a separation of true from false reasons; and (4) a complex situation which involves the separation of true reasons from false reasons, true facts from false facts.

TEST ONE. *The correct- or best-answer test.*

Place a cross before the one best answer to each of the following questions:

1. Why has Ecuador made but little progress?
____ (1) The hot, rainy coastal plain has many cacao plantations.
____ (2) Large quantities of tin and copper are mined in the mountains.
____ (3) The interior is mountainous; the coastal plain is a desert.
____ (4) The Indian population is lazy.

2. Why is the Caribbean Sea coast of greater value to Venezuela than the Orinoco River?
____ (1) Healthful, fertile highlands are near the Caribbean Coast.
____ (2) The Caribbean coastal plain is healthful and fertile.
____ (3) Agriculture is very important in the Orinoco Basin.
____ (4) The Orinoco River is navigable far into the interior of Venezuela.

3. Why does Brazil produce less of the world's rubber than formerly?
____ (1) The Amazon lowlands are hot and rainy.
____ (2) The rubber trees have been cut down to make way for farming.
____ (3) Rubber trees flourish on the plantations of southeast Asia.
____ (4) Brazil has a republican form of government.

4. Why do the people of northern Chile prefer a desert?
____ (1) Rains would dissolve the nitrates.
____ (2) The coastline of the desert has many good harbors.
____ (3) The desert does not have wealth that will tempt countries to want it.
____ (4) Copper and nitrate are found in the desert.

5. Why is Santos a more important coffee-exporting port than Rio de Janeiro?
____ (1) Santos is a smaller city than Rio de Janeiro.
____ (2) Santos has a better harbor than Rio de Janeiro.
____ (3) Santos is nearer the coffee fields than Rio de Janeiro.
____ (4) Many Italians work in the coffee fields.

6. Why has Peru developed slowly?
____ (1) The hot, rainy coast is heavily forested.
____ (2) The desert, the forests, and the mountains make it difficult to improve transportation.
____ (3) Large herds of llamas and alpacas graze on the coastal plain.
____ (4) Coffee is an important product of the coastal lowlands.

7. Why is tin the most important mineral export of Bolivia?
____ (1) Bolivia is connected with Pacific seaports by rail.
____ (2) Tin is of sufficient value to stand a high transportation cost.
____ (3) Most of the people of Bolivia are of Spanish descent.
____ (4) Tin is the only mineral that the people know how to mine.

8. Why is southern Chile sparsely populated?
____ (1) The rainfall is scanty in southern Chile.
____ (2) Southern Chile is heavily forested.
____ (3) Beds of coal have been found in southern Chile.
____ (4) The fishing industry is very important.

9. Why is wheat grown farther west in Argentina than corn?
____ (1) The pampas is the leading farming belt of Argentina.
____ (2) The rainfall increases westward from the ocean to the Andes Mountains.
____ (3) The higher, drier land of the west is better adapted to wheat.
____ (4) The western part of Argentina is heavily forested.

10. Why is the Central Valley of Chile a prosperous farming region?

____ (1) The rains come chiefly during the summer season.
____ (2) People, of Indian descent, who do not care to work, live in the valley.
____ (3) The mineral resources are not as valuable as in northern Chile.
____ (4) The fertile soil can be irrigated with water from the mountains.

The inclusion of four statements for each question reduces the guess factor to negligible proportions. The pupil is asked to select the best answer. In every case, to the one who knows the correct answer, one statement is so much superior to all other statements that only one statement can be checked.

The statements have been consistently made with reference to a definite control. One of the statements is a true reason, one a false reason, one a true statement that is not a reason, and one a false statement that is not even a false reason. The statements that are not reasons can be separated from the two reasons with a moderate amount of reasoning ability. The distinguishing of the true reason from the false reason involves a somewhat higher degree of reasoning ability. The true reason, of course, is not necessarily the only reason that accounts for the situation. Almost invariably a geographic situation is due to a complex of influences. The reason set forth in relation to each question, however, has been a major reason in accounting for the outcome. The fact that there are other reasons should be made clear through class discussions rather than tests. In teaching, the teacher

should always attempt to make it clear that "*some* of the factors of influence" rather than *all* the factors have been considered and evaluated. Geographic problems are of such a nature that, especially in elementary work, only an elementary insight into interpretations can be given.

Scores. The following tables show the scores made on Test One by a class that was taught by a topical method and a class that was taught by the problem method.

Class A. Problem method.	*Class B. Topical method.*
Median upper third....8.2	Median upper third....7.3
Median middle third...6.0	Median middle third...5.9
Median lower third.....4.1	Median lower third....4.0

The median for the upper third is higher by the problem method than the topical method. The lower third median, on the other hand, is practically the same. The results would seem to indicate that problem solving is more productive of results to the upper part than to the lower part of the class. Those who have the most ability to think apparently do better work through problem study than through topic study, if use of knowledge is the criterion. It is possible that the more alert members of the class, under the problem method, were stimulated more than the lower third, who may have depended primarily on memory for their achievement. That the problem method is somewhat superior to the topical method is indicated by the fact that the weaker members did no worse and the stronger members did better in Class A than in Class B. The other conditions which might have affected the results in a general way were about the same, as the two classes had been doing work of about the same quality.

Other possibilities of the best answer test. The number of statements can be increased or decreased. An increase in the number of statements decreases the guess factor; a decrease in the number of statements increases the guess factor. All statements should be of approximately equal value, or, if there is variation, this variation should be according to some consistently designed plan.

The statements might all be true reasons. The pupil then would be asked to select the best reason. Since the importance of each factor cannot be mathematically measured, the relative importance of each factor would be largely a matter of opinion according to different viewpoints, and therefore teachers might disagree over the best answer.

The statements might be true and false reasons only. It is next to impossible to enumerate four reasons, three of which are false, each of which seems to be a logical reason. One or two reasons stand out so prominently as the best reasons that, in effect, the test is similar to the test provided above.

The statements might include one true reason, and the other statements might merely be true facts. This type of test has the advantage of confronting the pupil only with material that is true, and therefore no false notions of facts, even through the tests, can be built up in the child's mind. The inclusion of false reasons and facts sets up a somewhat more difficult challenge.

Some exercises might contain no true reason that helps to explain the question raised. This device would cause the pupil to analyze very carefully the best answer of the

group. So numerous are the possibilities that the teacher, limited in time, must attempt to devise the combinations that will most economically and efficiently reveal class achievement.

TEST TWO. *True reasons and true facts.*

Place a cross before each of the three true reasons that help to explain "Why the Caribbean seaports of Colombia are more important than the Pacific seaports."

____ (1) The Magdalena River is the best transportation route to the Plateau of Bogota from the coast.
____ (2) The distributaries of the Magdalena River are obstructed with river deposits.
____ (3) A railroad connects the Magdalena Basin with the Pacific Coast.
____ (4) The Magdalena Basin drains northward into the Caribbean Sea.
____ (5) The navigable part of the Magdalena River is connected by rail with Caribbean seaports.
____ (6) Most of the people of Colombia live in the uplands.

Place a cross before each of the three true reasons that help to explain "Why most of the people of Brazil live in the southern part and near the coast."

____ (1) The climate is healthful and stimulating.
____ (2) Frosts and droughts sometimes injure the coffee berries.
____ (3) The chief coffee-growing district is near the coast of southern Brazil.
____ (4) Valuable minerals are found in the mountains of southern Brazil.
____ (5) Southern Brazil has no navigable rivers of much importance.
____ (6) Railroads have been built across the mountains of southern Brazil with the utmost difficulty.

TEST THREE. *True reasons and false reasons.*

Place a cross before each of the three true reasons that help to explain "Why the live stock industry is the leading industry of Uruguay."

____ (1) This country has excellent grasslands.
____ (2) Most of the people are descendants of Indians who cared for flocks.
____ (3) Alfalfa grows rapidly and yields heavily.
____ (4) The winters are so mild that expensive shelter for the animals is not necessary.
____ (5) There is a strong market for animal products in the adjoining countries.
____ (6) The animals are fed chiefly on the large crops of corn and oats raised.

Place a cross before each of the three true reasons that help to explain "Why Paraguay has not made much progress."

____ (1) The government has not been very good.
____ (2) There are large areas of very dense forests.
____ (3) Cattle do not thrive so near the equator.
____ (4) Much of western Paraguay is very swampy.
____ (5) There are no navigable rivers.
____ (6) Most of Paraguay is a desert.

TEST FOUR. *True reasons, false reasons, and facts.*

Place a cross before each of the four true reasons that help to explain "Why over three-fourths of the people of Argentina live in the pampas."

____ (1) Large farms are common on the pampas.
____ (2) Railroads can be cheaply constructed on the pampas.
____ (3) Most of the wheat is taken to market in sacks.
____ (4) The pampas have a deep, rich soil.
____ (5) Grasshoppers and droughts sometimes damage the crops of the pampas.
____ (6) The pampas have coal and iron ore for manufacturing.

___ (7) The climate is favorable for corn and wheat.
___ (8) The large forests of the pampas have encouraged the lumber industry.
___ (9) The native pastures and alfalfa fields yield large crops.
___ (10) The pampas are so flat that they are poorly drained.

TEST FIVE.

Place a cross before each of the four true reasons that help to explain "Why many more people live in the Central Valley of Chile than in northern or southern Chile."

___ (1) The Central Valley has many coffee and rubber plantations.
___ (2) Northern Chile is a desert.
___ (3) Nitrates are mined in northern Chile.
___ (4) Most of the people of the Central Valley are of Spanish descent.
___ (5) Lumber is an important product of southern Chile.
___ (6) The cool, rainy winters and the warm, dry summers of the Central Valley are favorable for wheat.
___ (7) The heavy snows of the mountains provide water for irrigation in the Central Valley.
___ (8) There are few good harbors along the coast of Chile.
___ (9) Southern Chile has a cool, damp climate and is heavily forested.
___ (10) The Central Valley lies between the Andes Mountains and the Coast Range.

Grading the tests. In all the above tests, emphasis is placed on the selection of responses. The pupil scrutinizes the statements with the idea of recognizing the relevant statements. The irrelevant material merely establishes a complex situation to determine the quality of relational thinking that the individual can per-

form. Credit, therefore, is not given for the pupil's decision that a certain statement is incorrect, but merely for the statements that are checked that should be checked as correct answers. This method is more nearly in accord with the method of grading a discussion in which the pupil engages. When the pupil is answering a question in his own way, he thinks of many facts, but permits only those facts that he believes have a bearing on the question raised to enter into his composition. Similarly in the problem tests, the pupil thinks of irrelevant and relevant facts, except that his thoughts are directed by the statements listed.

The definite naming of the number of statements to be checked helps to keep the pupil's mind within channels of thinking that can be definitely measured. It is well known that the same statement does not call to mind the same ideas in the minds of all. Even pupils tend to interpret a statement by what it connotes as well as by what it denotes. The knowledge that three statements should be checked, or four statements should be checked, helps the pupil to consider the relative values involved. If the number of statements to be checked is given, there is less probability of arguments over the results. It is much easier to devise six statements, three of which are far superior to the other three, than to devise six statements, three of which will challenge the pupil but have no positive bearing on the question raised.

In Tests Two, Three, and Four, the total number of possible points is twenty. One point is given for each statement marked correctly. If the pupil marks more

than the number of statements he is asked to mark, deduct one point in addition for each statement so marked. Thus, suppose the pupil marks three statements correctly in Test Two. He is given three points. Suppose he marks three statements correctly, but in addition marks one other statement. He is given two points. Suppose he marks every statement. He has, of course, marked the three statements correct. But, since he has marked three statements more than he should have marked, three points must be deducted from the three points he has made, which leaves him a grade of zero. Marking all the statements should leave the pupil with a grade of zero, the same grade he would receive if he did not mark any of the statements.

Scores. The following tables show the scores that were made on Tests Two, Three, and Four, by a class that was taught by the problem method and a class that was taught by the topical method:

Class A. Problem method.	*Class B. Topical method.*
Median upper third...15.1	Median upper third...12.2
Median middle third..12.3	Median middle third..10.1
Median lower third.... 9.4	Median lower third.... 8.7

In each third, those taught by the problem method did better work, although the least difference is in the lower third. With unimportant exceptions, pupils who rank high by the topical method also rank high by the problem method. The tables indicate that the training of native capacity to think will yield excellent results. There is a certain technique to be acquired in connection with the problematic organization of material. Teachers who use the problem method frequently state that it requires a week or

two of training before the pupils begin to respond desirably. The pupils who have been trained to interpret situations have mastered the mechanics of the problem type of test so that they can concentrate more efficiently on the conditions of the problem.

CHAPTER NINE

The Classification of the Details of Geography

Nature of the study. A detailed study was made of the Western States, including the Plateau and the Pacific States, to discover and classify the details which are customarily stressed more or less in the teaching of geography. An attempt was then made to devise tests to discover the extent to which pupils have mastered these details.

Proposed study. The following method of procedure was formulated:

1. Use the textbooks of the elementary schools as a basis for the study.
2. Break the content of each book up into measurable units involving simple reactions.
3. Analyze the content of each book in the form of questions.
4. Recognize both the informational and the interpretative type of question.
5. Classify the questions according to their nature.
6. Devise three answers to each question. Only one answer should be correct, but the other two answers should be of such a nature that a pupil might consider each answer a possible solution.
7. Attempt to use the same quality of composition in each of the three answers so that no answer will stand out by reason of the mechanics of expression.
8. Use as simple a vocabulary and sentence structure as the ideas involved will permit.

9. The correct answer should not hold the same position under each question; neither should the variation from a fixed order be uniform.
10. Use the arabic numeral to indicate the question and the arabic numeral in parenthesis, as (1), (2), and (3), to indicate the answers.
11. Arrange the test so that the correct answer can be indicated by underlining.
12. All questions suggested by one or more of the authors will be included in the list.
13. The tests will first be worked out as diagnostic tests. The questions in the same class may be used as a diagnostic test for that class.
14. General tests should be derived from the diagnostic tests. One or more questions, taken from each of the diagnostic tests, will constitute a general test.

Classes of questions. A study of the Western States (Plateau and Pacific States) resulted in the listing of almost a thousand different questions, grouped in thirty-three different classes as follows:

	No. of Questions
1. States associated with physical facts	40
2. Physical facts associated with states	40
3. States associated with facts related to life	25
4. Facts related to life associated with states	20
5. States associated with cities	40
6. Cities associated with states	40
7. Cities associated with facts related to life	65
8. Facts related to life associated with cities	59
9. Physical location of cities	40
10. Cities associated with physical features	40
11. States located named	32
12. States named located	32

13. The relative location of cities 13
14. The general location of cities relatively located 13
15. Relative location of natural phenomena 15
16. The general extent of natural phenomena relatively located 15
17. Physical facts concerning natural regions 59
18. Natural regions related to physical facts 34
19. Life influences over the environment 43
20. Physical influences over human interests 27
21. Physical influences on physical conditions 10
22. Products related to natural regions 26
23. Natural regions associated with products 13
24. Expressions defined 23
25. Definitions identified 23
26. Comparisons of physical facts concerning natural regions. 9
27. Comparison of facts concerning human activities 7
28. Natural processes explaining natural phenomena 20
29. Causes explaining natural phenomena 29
30. Processes related to man's activities 32
31. Causes related to human interests 53
32. Purpose resulting in action 14
33. Uses of products 14

Total number of questions 965

General test on the Western States. One question has been taken from each of the above classes in the construction of the following general test:

1. In which state is Glacier National Park?
   (1) Washington. (2) Idaho. (3) Montana.
2. Which physical feature is in Arizona?
   (1) Grand Canyon. (2) Yosemite Valley. (3) Death Valley.
3. Which state leads in the production of oil?
   (1) California. (2) Colorado. (3) Montana.

4. Which mineral is most important in Arizona?
   (1) Gold. (2) Copper. (3) Silver.
5. In which state is Cheyenne?
   (1) Idaho. (2) Montana. (3) Wyoming.
6. Which city is in Utah?
   (1) Reno. (2) Phoenix. (3) Salt Lake City.
7. Which city secures its water supply from Owens Valley, 240 miles away?
   (1) San Francisco. (2) Los Angeles. (3) San Diego.
8. Which fact applies to Butte?
   (1) Capital city. (2) Gold center. (3) Copper center.
9. Where is Seattle?
   (1) On the Columbia River. (2) On the seacoast. (3) On Puget Sound.
10. Which city is at the ocean outlet of the Great Valley of California?
    (1) San Francisco. (2) Los Angeles. (3) San Diego.
11. Which state is located between Nevada and Colorado?
    (1) Wyoming. (2) Utah. (3) Arizona.
12. Where is Oregon?
    (1) Between Washington and California. (2) Between Nevada and Idaho. (3) Between Washington and Montana.
13. In what order from north to south are the following cities located?
    (1) Butte, Denver, Cheyenne. (2) Butte, Cheyenne, Denver.
    (3) Denver, Cheyenne, Butte.
14. In which general position in the order indicated do Seattle, Portland, and San Francisco lie?
    (1) From east to west. (2) From north to south. (3) From west to east.
15. Which order from west to east is correct?
    (1) Cascade Mountains, Rocky Mountains, Coast Range.
    (2) Coast Range, Rocky Mountains, Cascade Mountains.
    (3) Coast Range, Cascade Mountains, Rocky Mountains.

16. In which direction must one go to reach in the order indicated, Mount Whitney, Mount Shasta, Mount Rainier?
(1) From north to south. (2) From west to east. (3) From south to north.
17. How is the Great Basin drained?
(1) To the ocean by the Colorado River. (2) To the ocean by the Columbia River. (3) No surface drainage to the ocean.
18. Where does it rain but seldom, but occasionally with heavy downpours?
(1) Puget Sound. (2) Coast Range. (3) Great Basin.
19. How much of the arid lands have been reclaimed through irrigation?
(1) 1,000,000 acres. (2) 15,000,000 acres. (3) 100,000,000 acres.
20. What effect does the Puget Sound climate have on man?
(1) Undermines his vitality and shortens his life. (2) Gives him energy and good health. (3) Healthful but takes away his ambition to work.
21. What effect do the Chinook winds have on snow fields?
(1) Blow the snow into great drifts. (2) Melt the snow very rapidly. (3) Bring more snows adding to the depth of the snow cover.
22. Which is the principal crop of the Columbia Plateau?
(1) Corn. (2) Wheat. (3) Potatoes.
23. In which region is the production of apples most important?
(1) Los Angeles Plain. (2) Yakima Valley. (3) Imperial Valley.
24. What is a placer?
(1) A vein of gold. (2) A deposit of sand and gravel, containing much gold dust. (3) A rock which contains fine particles of gold.
25. What is a man who is engaged in an attempt to find valuable minerals called?
(1) An explorer. (2) A discoverer. (3) A prospector.

26. Compare the climate of Puget Sound with that of the Great Valley of California.
(1) More rain and lower temperatures in Puget Sound lowland than in the Great Valley. (2) More rain and lower temperatures in the Great Valley than in the Puget Sound lowland. (3) More rain and higher temperatures in the Great Valley than in the Puget Sound lowland.
27. Compare the temperate and sub-tropical fruits of California as to their importance.
(1) The temperate fruits are more important. (2) The sub-tropical fruits are more important. (3) The temperate fruits are about one-third as important as the sub-tropical fruits.
28. How was the Great Valley of California formed?
(1) Carved and deepened by rivers. (2) The bed of an inland sea has been elevated above sea level. (3) An inland sea has been filled in with materials from the mountains.
29. Why does the rainfall of the Pacific Coast come mostly in winter?
(1) The air is colder in winter and cannot hold so much water vapor. (2) The winds blow harder from the mountains during the winter season. (3) The winds blow with greater regularity and strength from the adjoining ocean.
30. How are sugar beets marketed?
(1) The whole plant is hauled to the sugar mill. (2) The tops are removed and the rest of the beets hauled to the sugar mill. (3) The sugar beets are run through a press, the juice being drawn into barrels. This juice is taken to the sugar mills to be made into sugar.
31. Why do cattle and sheep need separate ranges?
(1) Cattle will not graze where sheep have been. (2) Sheep will not graze where cattle have been. (3) The cattle kick the sheep and kill or injure them.
32. Why does the government restrict the catching of salmon?
(1) So that the Indians will be able to spear enough for their

needs. (2) So that the industry will continue year after year. (3) So that the market will not be over supplied with salmon.

33. What use is made of sugar beets?
(1) The roots are fed to stock; sugar is secured from the tops. (2) The tops are fed to stock; sugar is secured from the roots. (3) Sugar is secured both from the tops and the roots, the pulp alone being fed to live stock.

Diagnostic tests of the Western States. The questions under each test have been selected because they represent a particular point of view. It may not seem desirable to stress the thirty-three viewpoints equally. Five questions, selected from a desired test, will reveal fairly accurately the extent to which the viewpoint represented by the test has been mastered. These tests are primarily of value because of the material they furnish for general tests.

This study brings vividly to the front the numerous details which even an elementary presentation of geography involves. No pupil should be expected to learn or retain all the details listed. Every pupil, however, should secure impressions concerning details of each class of subject matter. A minimum list of facts should be required of all pupils. In addition, every pupil should know a great many details of geography, the particular details varying according to the pupil.

The attention of the teacher and pupils should not be centered on the minute details listed in this chapter. The attention should be directed to organizing centers in the form of topics or problems that are significant in helping to understand geographic adjustments. Incidentally,

however, many details will be mastered as the pupil attempts to understand the situation. The efficiency of instruction can be measured through the organization of these details into measurable units. If the pupil has merely been drilled on the classes of details, a test based on these classes conveys no adequate idea of the child's comprehension of vitalized geography.

CHAPTER TEN

The Relation of Assisted and Unassisted-Memory-Recall Tests

Explanation. Some questions admit of but one correct answer. These can be included in tests in which the pupil is given no assistance in memory recall. The answers to other questions cannot be sufficiently restricted unless the thinking processes of the pupil are controlled to some extent in relation to possible answers.

A study of a part of an elementary book in geography was made with the following questions in mind: (1) Which statements can be used as a basis for a test in which the memory is given no assistance, and (2) Which statements should be used as a basis for a test in which the memory is assisted through a restricted choice of answers?

A topical organization of the content was retained. Eighty-one measurable units were listed under "pure-memory recall"; fifty-seven measurable units were listed under "assisted-memory recall." The two types of tests reënforce each other so that practically the whole of the content of the selected part of the book is covered.

The New England States

Pure-memory recall.

Political phase.

1. What is the capital of Maine?
2. What is the capital of New Hampshire?

3. What is the capital of Vermont?
4. What is the capital of Massachusetts?
5. What is the capital of Connecticut?
6. What is the capital of Rhode Island?

Population.

7. What is the largest city of Maine?
8. What is the largest city of New Hampshire?
9. What is the largest city of Vermont?
10. What is the largest city of Massachusetts?
11. What is the largest city of Connecticut?
12. What is the largest city of Rhode Island?

Relief.

13. Name the longest river of New England.
14. What mountains have several peaks named after presidents of the U. S.?
15. Name the highest mountain peak of New England.
16. Name the largest lake of New England.
17. On what river is the largest used water-power site of New England?

Agriculture.

18. Name a river valley in which tobacco is a special crop of importance.
19. Name a state in which much sweet corn is raised for canning.
20. Name a state in which seed potatoes are raised in important quantities.
21. In the bogs of which state are cranberries raised in large quantities?

Forests and forest products.

22. From what foreign country does New England import much wood pulp?
23. What city on the Connecticut River has great paper mills?
24. In what city is the paper used by the government in printing bank notes made?

25. In what mountains has the government established a forest reservation?
26. What state ranks first in the production of maple sugar?
27. Name an important lumber center on the Kennebec River.
28. Name an important lumber center on the Penobscot River.
29. What city in northern Maine has the largest paper mills in the world?

Quarries and mines.

30. What city on the coast south of Boston is noted for its granite quarries?
31. What city of Vermont is noted for its granite quarries?
32. What state ranks first in the quarrying of marble?
33. What city in Vermont is noted for its marble quarries?
34. Which New England state leads in the quarrying of slate?
35. Which river valley is noted for its sandstone quarries?

Textiles.

36. In which city of the New England States did Samuel Slater construct the first successful mill for the manufacture of cotton goods?
37. Name an important cotton manufacturing city of New Hampshire.
38. Name an important cotton manufacturing city in northern Massachusetts.
39. Name an important cotton manufacturing city in southern Massachusetts.
40. Name an important cotton manufacturing city in Rhode Island.
41. Name the city that is the second greatest wool market in the world.

Boots and shoes.

42. Which city is the principal market for hides and leather?
43. Name the largest center for the manufacture of boots and shoes.

44. Name a city south of Boston important in the manufacture of shoes.
45. Name a city on the seacoast north of Boston important in the making of shoes.
46. Name a city of Massachusetts, on the Merrimac River, famous for its shoes and slippers.

Metals.

47. Name a city of Massachusetts known for its manufacture of watches.
48. Name a city in Rhode Island known for its manufacture of jewelry.
49. Name a city of Massachusetts known for its manufacture of wire goods and looms.
50. Name a city of Connecticut known for its manufacture of watches.
51. Name a city of Connecticut known for the manufacture of sewing machines.

Fisheries.

52. What city on the mainland of Massachusetts was formerly known as an outfitting station for catching whales?
53. What city on an island off the coast of New England was formerly known as an outfitting station for catching whales?
54. What city of New England is the nearest rival of Boston in the fishing industry?
55. Name the best known fishing "banks" that the New England fishermen visit.
56. Name the most important fishing center on the coast of Maine.
57. The shores of which state yield the largest number of sardines?
58. The shores of which state yield the largest number of lobsters?
59. Which state is most important in the canning of fish and other sea foods?

Recreation and resorts.

60. Name the best-known seaside resort of Rhode Island.
61. Name a well-known resort on an island along the coast of Maine.
62. Name a city at one time important in the catching of whales, now important as an island resort.
63. On what island is the Lafayette National Park?

Educational and cultural centers.

64. In what city is Harvard University located?
65. In what city is Yale University located?
66. Name a hill in Boston that is of much historic importance.
67. Name a building in Boston that is associated with the ride of Paul Revere.
68. In what harbor did the Pilgrims first cast anchor?

Transportation.

69. In what state is the longest railroad tunnel in this country?
70. What is the name of the canal that shortens the water distance from Boston to New York City?
71. Through what New England port does the Grand Trunk Railroad of Canada have an ocean outlet?
72. Which state has no seacoast?
73. What is the name of the single good harbor of New Hampshire?
74. What important port is on Lake Champlain?
75. What important city of Massachusetts is approached through Narragansett Bay?
76. Name the city at the head of navigation of the Merrimac River.
77. Name the city at the head of navigation of the Connecticut River.
78. Name the city at the head of navigation of the Kennebec River.
79. Name the city at the head of navigation of the Penobscot River.

80. Name the city at the head of navigation of the Androscoggin River.
81. What city is located at the westernmost point of Massachusetts Bay?

Choice of answers.

Area and population.

1. Compare the areas of the several New England States with other states.
   (*a*) Smaller than most other states.
   (*b*) Larger than most other states.
   (*c*) About the size of the average state.
2. Compare the combined area of the New England States with Texas.
   (*a*) Much larger than Texas.
   (*b*) About the same size as Texas.
   (*c*) Much smaller than Texas.
3. How is the population of New England distributed?
   (*a*) The three northern states have more people than the three southern.
   (*b*) The three southern states have more people than the three northern.
   (*c*) The three northern states have about the same number of people as the three southern states.
4. How is the city population distributed?
   (*a*) More people in the three northern states live in cities than in the three southern states.
   (*b*) More people in the three southern states live in cities than in the three northern states.
   (*c*) About as many people in the three northern states live in cities as in the three southern states.
5. How has the proportion of English people changed?
   (*a*) More people of English descent than formerly.
   (*b*) Fewer people of English descent than formerly.
   (*c*) About the same number of people of English descent as formerly.

Relief.

6. How much of New England was covered with the continental glacier?
   (*a*) All of New England.
   (*b*) All except the southern part of New England.
   (*c*) All except the highest peaks of New England.
7. Where are lakes more numerous?
   (*a*) In glaciated regions.
   (*b*) In unglaciated regions.
   (*c*) On old, worn-down plains.
8. Where are lakes more numerous?
   (*a*) In the New England States.
   (*b*) In the Southern States.
   (*c*) In the Plateau States.
9. Which kind of river is the more useful to man?
   (*a*) A river with a steady flow.
   (*b*) A river with an irregular flow.
   (*c*) A shallow river.
10. For which purpose are the streams of New England of greatest value?
   (*a*) Navigation.
   (*b*) Water power.
   (*c*) Irrigation.
11. What is the nature of the shore line of New England?
   (*a*) Hilly and uneven.
   (*b*) Smooth and regular.
   (*c*) Hilly and regular.
12. Compare the actual shoreline of Maine with a direct line.
   (*a*) About the same length.
   (*b*) Two times longer.
   (*c*) Ten times longer.
13. What is the nature of the surface of Martha's Vineyard and Nantucket?
   (*a*) Similar to Cape Ann.

(*b*) Similar to Cape Cod.
(*c*) Similar to Cape Cod and to Cape Ann.

14. What is the condition of the summit of Mount Washington?
(*a*) Covered with trees.
(*b*) Once covered with trees which have been cut down.
(*c*) Above the timber line.

Climate.

15. How were the early settlers affected by the climate?
(*a*) Surprised at the severity.
(*b*) Surprised at the mildness.
(*c*) Found about what they expected.

16. Where is the heaviest snowfall?
(*a*) In the northern part of New England.
(*b*) In the southern part of New England.
(*c*) Along the coast of New England.

17. Where are sleds and sleighs used most frequently?
(*a*) In the northern part of New England.
(*b*) In the southern part of New England.
(*c*) Along the coast of New England.

18. From what direction does the wind generally bring most rain?
(*a*) From the west.
(*b*) From the southeast.
(*c*) From the northeast.

19. How does the length of the growing season vary?
(*a*) Six months in the south and six months in the north.
(*b*) Four months in the south and six months in the north.
(*c*) Six months in the south and four months in the north.

Agriculture.

20. Which is the most important in determining what crops will grow?
(*a*) Climate.
(*b*) Relief.
(*c*) Soil.

21. In the early days, which was the leading industry of New England?
    (*a*) Fishing.
    (*b*) Lumbering.
    (*c*) Farming.
22. Where is most of the good farm land of New England?
    (*a*) In the lowlands.
    (*b*) In the plateaus.
    (*c*) In the mountains.
23. How is the farm land of the Connecticut Valley distributed?
    (*a*) More farm land in Connecticut and Massachusetts than in New Hampshire and Vermont.
    (*b*) More farm land in New Hampshire and Vermont than in Connecticut and Massachusetts.
    (*c*) About the same amount of farm land in New Hampshire and Vermont as in Connecticut and Massachusetts.

Quarries and mines.

24. To what extent is coal mined in New England?
    (*a*) Much coal.
    (*b*) Practically no coal.
    (*c*) A moderate amount of coal.
25. To what extent does New England depend on her rivers for power?
    (*a*) All the power of New England factories is water power.
    (*b*) More than half the power of New England factories is water power.
    (*c*) Only about one-third the power of New England factories is water power.
26. What is the relative importance of water and coal in providing New England with power?
    (*a*) Coal is much more important than water power.
    (*b*) Water power is much more important than coal.
    (*c*) About the same amount of power is derived from coal that is derived from water.

27. How does muck compare with peat in the degree of decay?
    (*a*) Muck is decayed more than peat.
    (*b*) Peat is decayed more than muck.
    (*c*) Muck and peat are decayed to about the same extent.
28. To what extent is iron ore mined in New England?
    (*a*) Practically no iron ore.
    (*b*) Much iron ore.
    (*c*) A moderate but very important amount of iron ore.
29. Compare granite and marble as to softness.
    (*a*) Granite is softer than marble.
    (*b*) Marble is softer than granite.
    (*c*) Granite and marble are of the same degree of softness.

Boots and shoes.

30. Compare the tanning of skins in Massachusetts with the tanning of skins in Wisconsin and Pennsylvania.
    (*a*) More important in Massachusetts.
    (*b*) More important in Wisconsin and Pennsylvania.
    (*c*) About the same importance in all three states.
31. Which is the most important use for leather?
    (*a*) Harness.
    (*b*) Pocketbooks.
    (*c*) Shoes.
32. How are shoes generally made?
    (*a*) Chiefly by hand.
    (*b*) Chiefly by machinery.
    (*c*) About 50% by hand and about 50% by machinery.
33. Where does most of the material for shoes come from?
    (*a*) From New England.
    (*b*) From outside of New England for the most part.
    (*c*) About the same amount from New England as from other places combined.

Textiles.

34. Where was the weaving and the spinning done in the early days?

(*a*) In the homes.
(*b*) In the factories.
(*c*) Keen competition between the homes and the factories.

35. Where was machinery for spinning and weaving cotton first used?
(*a*) In England.
(*b*) In America.
(*c*) At about the same time in England and in America.

36. What kind of labor is needed in textile mills?
(*a*) Unskilled labor.
(*b*) Much skilled labor.
(*c*) About the same number of skilled and unskilled laborers.

37. Where is most of the cotton used in New England raised?
(*a*) In New England.
(*b*) In the Southern States.
(*c*) In foreign countries.

38. Where did woolen manufactures in New England begin?
(*a*) On the farms.
(*b*) In village homes.
(*c*) In factories.

39. How is the woolen industry of to-day distributed?
(*a*) In great mills in a few cities.
(*b*) In small mills in many small cities.
(*c*) In many small mills in a few large cities.

40. Where does most of the wool used in New England factories come from?
(*a*) New England farms primarily.
(*b*) Mostly from widely scattered areas outside of New England.
(*c*) About half from New England.

Metals.

41. In what sort of metal goods does New England specialize?
(*a*) Small metal goods.
(*b*) Large, bulky metal goods.
(*c*) Bridge and skyscraper materials.

Forest and forest products.

42. How widely distributed were the forests of New England when the white man first came?
    (*a*) Practically all New England was covered with forest.
    (*b*) Very little of New England was covered with forest.
    (*c*) About half of New England was forested.

43. From what areas were the forests first removed?
    (*a*) From the smooth lowlands.
    (*b*) From the rough uplands.
    (*c*) From the smooth uplands.

44. Where are the most valuable remaining forests?
    (*a*) In the northern part of New England.
    (*b*) In the southern part of New England.
    (*c*) In the western part of New England.

45. Where are the wood lots of today?
    (*a*) On the rougher, higher land.
    (*b*) In the lowlands.
    (*c*) On the areas with rich soil.

46. Compare the lumber industry with earlier times.
    (*a*) More important than formerly.
    (*b*) Less important than formerly.
    (*c*) Of about the same importance as formerly.

47. What kind of material is used in making paper at Holyoke?
    (*a*) Primarily wood pulp.
    (*b*) Primarily rags.
    (*c*) Primarily old paper.

48. Where does most of the wood pulp for the manufacture of paper come from?
    (*a*) New England.
    (*b*) Outside of New England in Europe.
    (*c*) Outside of New England, especially from Canada, as well as from New England.

49. From what is most of our paper made?
    (*a*) Rags.
    (*b*) Wood pulp.
    (*c*) Straw.
50. What wood is used the most in making paper?
    (*a*) Fir.
    (*b*) Spruce.
    (*c*) Hemlock.
51. Which of the New England States produce the most wood-pulp for paper?
    (*a*) The three southern states.
    (*b*) The three northern states.
    (*c*) The three western states.

Fisheries.

52. How are cod and halibut caught?
    (*a*) With hooks.
    (*b*) With seines.
    (*c*) In traps.
53. How are mackerel caught?
    (*a*) With hooks.
    (*b*) In seines.
    (*c*) In traps.
54. How are lobsters caught?
    (*a*) With hooks.
    (*b*) With seines.
    (*c*) In traps.
55. Where do mackerel swim?
    (*a*) Near the surface.
    (*b*) Far beneath the surface.
    (*c*) Both near and far below the surface.
56. Where do cod and halibut live?
    (*a*) Near the surface.
    (*b*) Far beneath the surface.
    (*c*) Near the surface in winter and far below the surface in summer.

57. What is the real name of the sardines caught along the coast of Maine?
   (*a*) Sardines.
   (*b*) Herring.
   (*c*) Mackerel.

A general test may be constructed by selecting one question from each of the classes. A diagnostic test, for certain types of knowledge, may be constructed by selecting several questions from the classes of knowledge that the teacher desires to use. Various other units in geography may be similarly analyzed. The teacher may also have the pupils devise such tests, as the detailed analysis required helps the pupils to remember and to digest the content.

CHAPTER ELEVEN

Available Tests and Scales in Geography

Attitude of geographers toward objective tests. The shift in emphasis from descriptive to interpretative geography has found the teaching profession with an inadequate body of content to teach the new viewpoint. Instances of geographic influences may be found in numerous articles and books, but the systematic organization of geographic content is still in its infancy. The trained geographers have directed their time and energy toward the acquisition of geographic interpretations. Attending these attempts to rewrite the content of geography are differences of opinion concerning the content itself. As a result, the attention of geographers has rarely been drawn toward the devising of objective tests, while the administrators and supervisors have been at a loss to determine what should be tested.

Both administrators and geographers are beginning to feel the need for adequate geography tests. During the past few years several series of tests have become available. Each of these series has certain excellent qualities. Among the available tests may be mentioned the following:

1. The Hahn-Lackey Geography Scale
2. The Posey-Van Wagenen Geography Scales
3. The Gregory-Spencer Geography Tests
4. The Witham Standard Geography Tests

5. The Whittier State School Geography Scale
6. The Buckingham-Stevenson Place Geography Tests
7. The Courtis Geography Tests
8. Starch's Geography Tests
9. Thompson's Minimum Essentials in Geography
10. The Branom Place, Factual, and Problem Tests
11. The Branom Practice Tests in Geography.

1. The Hahn-Lackey Geography Scale. Six of the modern textbook series were used in the compilation of about 600 questions and exercises. For various reasons, all but 216 questions and exercises were eliminated. The 216 questions were then given to 1696 pupils distributed among the fourth, fifth, sixth, and seventh grades. The questions were grouped according to the degree of difficulty that the pupils experienced in answering them. Each list was designated by a letter of the alphabet, the most difficult being called "Step A" and the least difficult "Step Y." The authors state that they have covered all phases of geography work.

Questions and exercises of Step P.

1. Name two large rivers of South America.
80. What two important products are brought to us from Brazil?
88. How can you get from New York to London, and in what direction would you go?
89. How can steamboats go from New York to San Francisco by the shortest route?
100. Name the chief occupation of the people of Australia.
105. Give two reasons why mountainous regions are not good for farming.
28. How can we tell how big a country is by studying a map?
10. How long does it take the earth to go around the sun?

67. Give the principal reason why such dense forests grow along the Amazon.
70. Which part of the United States is most important for manufacturing and which for agriculture?
74. Where may snow be found in the hot belt near the equator?
77. Why is there so little rainfall in the Great Basin of the United States?
78. Name one way in which the Panama Canal will be an advantage to the United States in its trade with South America.
81. During what months does Argentina have winter?
82. In what industry or kind of work are most of the people of England engaged?
31. Why do so few people live in deserts?

In answering the questions of Step P or any part of it, fourth grade pupils should make 34%, fifth grade pupils should make 50%, sixth grade pupils should make 58%, seventh and eighth grade pupils should make 73%.

According to the authors, the scale may be used: (1) as a basis for promotion or classification, (2) to compare class achievement with the standard, (3) to measure progress, (4) to discover whether the different phases of geography are being stressed, and (5) to check methods of instruction and school organization.

The means used to classify the questions does not indicate whether the questions were difficult because the pupils had not studied a continent, or because, having studied a continent, the pupils had not mastered the content. If the pupil has not studied South America, but has studied Asia, it is altogether possible that he might be able to name two large rivers of Asia, although he, of course, would not

be able to name two large rivers of South America. The teacher need not give all questions of a step but may select questions therefrom, but she finds it difficult to secure enough appropriate questions in this way.

2. The Posey-Van Wagenen Geography Scales. The authors have devised two types of scales, (1) the informational, and (2) the interpretative.

The following questions are taken from the informational scales:

1. Which is further toward the south?
   (*a*) Spain or Sweden? _____
   (*b*) Holland or Italy? _____
   (*c*) France or Norway? _____
3. Name one of each of the following things found in the United States.
   A river. _____
   A mountain range. _____
10. What is the largest city of the United States on the Gulf of Mexico? _____
11. Name five states bordering on the Atlantic Ocean.
    1. _____ 2. _____ 3. _____
    4. _____ 5. _____

Some of the questions, taken from Thought R, Division 2, Grades 7 and 8, are as follows:

1. Minnesota has immense fertile fields and vast iron resources, but no coal mines. The coal, which is necessary for the smelting of iron, can be more cheaply obtained in the east than elsewhere. It costs more, however, to transport the coal from the east than to transport the iron ore to an eastern city.

Where would you expect much of the iron ore mined in Minnesota to be smelted? _____

6. The winds, blowing over northern Africa, come from southern Europe or Asia and hence travel over only a small area of water. At the same time the climate of northern Africa is warmer than the regions from which these winds come.

What do these facts suggest about the amount of rainfall in northern Africa? _____

19. An indented coastline and poor soil tend to make what sort of a people? _____

25. France, which is smaller than the state of Texas, raises on half of its area about one half as much wheat as the whole United States.

What inference can be drawn from this statement?

_____

29. Cities have their origin and growth because of being (*a*) seaports, (*b*) manufacturing centers, (*c*) distributing centers, (*d*) health and scenic resorts, (*e*) political centers. Which one of the above would you say has been foremost in the rise and growth of each of the following?

1. London. _____ 2. Madrid. _____
3. Nice. _____

A wide range of geographic content is represented in these tests. The ability of a pupil to name two or three of the capitals of Europe is taken as an index of his ability to name all the capitals of Europe. The more than 300 tasks of several items each were given to about 850 pupils. The value of the tasks was determined by the per cent of pupils who did each task correctly. The authors compare their scale in its workings to a thermometer. The scale values in geography go below and above seventy-five in equal units, called deciquartiles. Each of the scales consists of thirty tasks. Duplicate tests are provided. The

giving of the scales is not difficult, but the scoring of the papers is somewhat complicated.

In the Teachers' Handbook, accompanying the scales, the authors list right answers, half right answers, and wrong answers. While the scales are highly objective they are not altogether objective, and there may be considerable uncertainty as to how to weigh certain answers. For example, the pupil is asked to name a river of the United States. Strictly speaking, a teacher would need to know *all* the rivers to weigh the value of the pupil's reactions. The pupil is asked to name the largest city of the United States on the Gulf of Mexico. If the pupil names New Orleans, since New Orleans is on the Mississippi, 100 miles from the gulf, how shall the answer be evaluated? If he does not name New Orleans, how shall the answer be evaluated?

While some of the thought questions, as No. 1 in the illustrations above, are primarily comprehension questions in reading, many of the thought questions, as No. 6 in the illustrations above, not only involve comprehension of meaning, but a knowledge of physical influences.

3. The Gregory-Spencer Geography Tests. The authors have attempted to stress "the subject matter actually being taught." The test is divided into eight parts. Samples from each of the parts are given below:

Part One. Trade routes and their products.

Cotton
Coal is shipped from Calcutta to London.
Iron ore

Part Two. Miscellaneous geography.

The Erie Canal
The Suez Canal connects Lake Superior with Lake Huron.
The Soo Canal

Part Three. Causal geography (United States).

The Great Basin of the United States is thinly settled, because
_____ it is surrounded by mountains.
_____ it is dry and the climate is severe.
_____ the soil is not fertile.

Part Four. Causal geography (World).

Nearly half the people of France are engaged in agriculture because
_____ it has favorable climate and much level land.
_____ it has no coal for manufacturing.
_____ the French are not skilled in manufacturing and must rely on farming for a living.

Parts Five and Six. Place and descriptive geography.

These parts contain a list of 24 cities, and a list of 24 descriptive phrases for cities. The pupil is asked to indicate the number that represents each city on an accompanying outline map. The pupil is also asked to indicate the city represented by each descriptive phrase.

Parts Seven and Eight. Political and place geography.

These parts contain a list of 11 countries, and a list of 11 descriptive phrases for countries. The pupil is asked to indicate the number that represents each country on an accompanying outline map. The pupil is also asked to indicate the country represented by each descriptive phrase.

The test is to be used in grades 6, 7, and 8. The test has a diagnostic function. By studying the achievements of the pupils for the various parts, the teacher can determine whether the various phases of geography are being

properly emphasized. It is doubtful, however, whether the part, Miscellaneous Geography, has much value in diagnosis. The tests are highly objective and are not so difficult to score as the Posey-Van Wagenen Scales. It may be questioned whether the content is sufficiently representative and comprehensive to be used repeatedly in testing classes.

4. The Witham Standard Geography Tests. The tests available are (1) the World, (2) the United States, (3) South America, (4) Europe, (5) Asia, (6) Africa, (7) North America, and (8) commercial geography. The test on South America may be taken as an illustration.

1. On an accompanying outline map of South America, the pupil is asked to write the name of each country across its surface.
2. Two lines drawn across a map of South America show the location of the Tropic of Capricorn and the Equator. The pupil is asked to write the name of each on the correct line.
3. The three principal rivers of South America are shown on an outline map. The pupil is asked to write the correct name for each near its mouth.
4. Ten cities are located by small circles on the map. The pupil is asked to write the name of each city near its circle.
5. The three principal mountain ranges are shown on the map. The pupil is asked to write the name of each across the mountains.
6. The (1) pampas, (2) llanos, and (3) selvas are indicated on the map. The pupil is asked to write the name of each across its surface.
7. The pupil is asked to locate by writing the name in the appropriate part of the map, (1) Cape Horn, (2) Strait of Magellan, (3) Lake Titicaca, and (4) Falkland Islands.

8. Name the language of Brazil, and also the language of the other South American countries.
9. Name three principal plant products and three principal mineral products of South America.
10. What direction is South America from North America?

The tests as a whole deal with the very elementary notions of geography. They are stimulating, but probably are not sufficiently comprehensive. Their repeated use might lead to a very superficial consideration of the subject. The author has tentative median scores and a special device for diagnosing the results of testing.

5. The Whittier State School Geography Scale. This scale consists of eight tests. There are five answers to each question. The pupil underlines the answer that he believes is correct.

TEST ONE. *Geographical names.*

1. Euphrates is a river continent city state country

TEST TWO. *Cities.*

1. Paris is in Manchuria England France Missouri Mexico

TEST THREE. *Products.*

1. Pineapples come from Canada Hawaii Ohio Norway Delaware

TEST FOUR. *People.*

1. Negroes live mostly in Japan Sweden Scotland Africa Canada

TEST FIVE. *Physiography.*

1. Icebergs float near Brazil Africa Borneo Newfoundland Texas

TEST SIX. *Islands.*

1. Iceland is near India Mexico Switzerland Chile Greenland

TEST SEVEN. *Travel.*

1. Gibraltar to Naples: through Atlantic Mediterranean Arctic Indian Pacific

TEST EIGHT. *Animals.*

1. Camels are common in Arabia Iceland Wales France Norway

There are fifteen questions in each test. The scale is a stimulating exercise. It is diagnostic in so far as the eight classes of knowledge are concerned. Since it deals with world geography, the test probably should be given at the completion of the course of study in geography. The test is simple in its construction. It is not sufficiently comprehensive.

6. The Buckingham-Stevenson Geography Tests. The authors have experimented considerably in the field of geography testing. One of their products is a pamphlet dealing with place geography for the United States and for the World. Only one pamphlet, in the hands of the teacher, is necessary for testing a class. The teacher gives the question and pauses a moment while the pupils write down an answer. Three forms are provided for the United States and also for the World. The nature of the tests may be inferred from the following sample questions:

The World.

Name the continent on or nearest to which each of the following is located:

11. Catskill Mts. 16. Canada. 30. Lake Michigan. 39. Danube River.

Name the ocean nearest to which each of the following seaports is located:

54. Calcutta. 65. Sydney.

Name the ocean into which each of the following rivers empty:
66. St. Lawrence. 69. Kongo.
Name the country in which each of the following cities is located:
70. Berlin. 80. Hamburg.

The authors also have (1) information tests, and (2) problem tests. The information tests involve the selection of the right answer from four answers given.

( ) Which city is nearest to Denver?
1. Los Angeles. 2. Seattle. 3. St. Louis.
4. Salt Lake City.

( ) Which state raises the most rice?
1. Vermont. 2. Louisiana. 3. Oklahoma.
4. Iowa.

( ) Which state has the most railroad mileage?
1. Vermont. Arizona. 3. Texas. 4. Iowa.

( ) Which city has the coldest climate?
1. Milwaukee. 2. Seattle. 3. Cincinnati.
4. Birmingham.

The problem tests involve a selection of the correct or best answer from four answers.

( ) 1. Why is New England a great manufacturing district in spite of its lack of coal?
(1) There is a large supply of cheap labor in these states.
(2) Water power is abundant and railroads make the transportation of coal easy.
(3) Most of the manufacturing can be done by hand.
(4) Boston is an excellent market for manufactured goods.

( ) 2. Why do many people live in the North Atlantic States?
(1) The position and natural resources of these states are favorable to commerce and industry.
(2) People prefer to live near the ocean.
(3) These states have been settled for many years.
(4) Agriculture is very profitable in these states.

The authors have not systematically and comprehensively organized the content of geography for all parts of the world. Their efforts, however, are highly commendable, and they have done much to popularize geography tests.

7. The Courtis Geography Tests. These tests deal with the distribution of countries, states, and cities in relation to maps on which distributions are shown by means of numbers. For example, each state of the United States is numbered on an outline map. The names of the states are listed under the map. The pupil is expected, opposite each state name, to show the number that represents the state on the map.

8. Starch's Geography Tests. These tests deal in an elementary way with geographic locations.

9. Thompson's Minimum Essentials in Geography. These tests consist of sentences with missing words here and there. The pupil is asked to insert the appropriate words wherever blanks occur.

10. The Branom Place, Factual, and Problem Tests. These tests deal with (1) place geography, (2) facts about places, and (3) problems. The author has analyzed the textbooks for the elementary schools from the standpoint of modern geography. Standards have been established for the determination of the relative value of the material. An attempt has been made to cover the field of geography so comprehensively that the use of the tests will not result merely in stressing a few points in teaching. Duplicate tests have been provided.

Tests are available for the United States, North America, Europe, Asia, Australia, Africa, South America, and

the World. The tests are objective, and, barring clerical inaccuracy, can be scored just as easily by the pupil as by the teacher. This objectivity is reached through the control of answers. The pupil can cover much ground in a short time, as the mechanical work required is, in every instance, reduced to a series of straight lines and crosses. The tests have been made sufficiently difficult, it is believed, to distribute the upper as well as the lower third of a class. The tests are diagnostic, and will reveal the character of instruction in the light of the standards established.

The nature of the tests may be inferred from the following sample questions:

United States. Place Tests A.

TEST ONE. *The location of states.*

1. Underline the state that extends from Lake Ontario to the Atlantic Ocean.

(1) Connecticut. (2) New Jersey. (3) New York. (4) Virginia. (5) Maryland.

TEST TWO. *The location of physical features by states.*

1. Underline the location of Mount Whitney.

(1) Washington. (2) Oregon. (3) California. (4) Colorado. (5) Montana.

TEST THREE. *The location of cities by states.*

1. Underline the location of Salt Lake City.

(1) Nevada. (2) Colorado. (3) Utah. (4) Arizona. (5) New Mexico.

TEST FOUR. *The location of cities by physical features.*

1. Underline the location of New York City.

(1) Delaware River. (2) Merrimac River. (3) Mohawk River. (4) Connecticut River. (5) Hudson River.

United States. Factual Tests A.

TEST ONE. *Capitals of states.*

1. Underline the capital of Ohio.
   (1) Cleveland. (2) Columbus. (3) Akron. (4) Youngstown. (5) Cincinnati.

TEST TWO. *Largest cities of states.*

1. Underline the largest city of Illinois.
   (1) Springfield. (2) Peoria. (3) Chicago. (4) St. Louis. (5) Indianapolis.

TEST THREE. *The leadership of cities.*

1. Underline the product for which Akron is best known.
   (1) Flour. (2) Sewing machines. (3) Rubber goods. (4) Shoes. (5) Meat.

TEST FOUR. *The leadership of states.*

1. Underline the state that leads in the production of corn.
   (1) Ohio. (2) Indiana. (3) Missouri. (4) Iowa. (5) Texas.

TEST FIVE. *Statements about the United States.*

Five of the following statements are true; five of the following statements are not true. Place a cross before the five true statements.

____ 1. The Missouri-Mississippi River is the longest river in the world.
____ 2. In the Rocky Mountains, the eastern slopes have the heavier rainfall.
____ 3. Most of the irrigated lands are in the western half of the United States.
____ 4. The south is the leading section in the raising of hogs.
____ 5. Most of the salmon are caught along the New England coast.
____ 6. Over half the coal comes from the eastern half of the United States.

____ 7. The Pacific States now produce more lumber than the Southern States.
____ 8. The northeastern section of the United States is the most important manufacturing area.
____ 9. The commerce of the Ohio River is less valuable than that of the Upper Mississippi River.
____ 10. The value of the foreign trade with South America is greater than that for any other continent.

United States. Problem Tests A.

TEST ONE. *Best answers.*

Place a cross in front of the best answer to the following question:

1. Why is wheat important in the Columbia Plateau?
____ 1. The plateau has heavy rainfall in summer.
____ 2. The plateau has many deep canyons.
____ 3. The plateau has winter rains but dry summers.
____ 4. Most of the soil is a rich alluvial soil.

TEST TWO. *True reasons and facts.*

Place a cross before each of the three reasons that help to explain "Why transportation on the Mississippi River should increase in importance."

____ 1. Dredge boats are necessary to help keep the channel of the river at the right depth.
____ 2. Freight moves more slowly by water than by rail.
____ 3. The railroads need the help of the river in carrying products.
____ 4. Several river cities are planning to build modern docks for the loading and unloading of products.
____ 5. Transportation by water is said to be cheaper than transportation by land.
____ 6. The river varies in volume from month to month.

TEST THREE. *True and false reasons.*

Place a cross before each of the three true reasons that help to explain "Why truck farming is the leading industry of the Atlantic Coastal Plain."

____ 1. In the spring, products are ready for the market before similar products grown farther north are ready for market.
____ 2. The sandy soil warms quickly as the summer season comes on.
____ 3. The large cities of the coastal plain use all the truck garden products that can be grown on the coastal plain.
____ 4. The mountains and the ocean help to keep frost from forming.
____ 5. Most of the truck garden products are transported to northern markets by water.
____ 6. The soil of the coastal plain is so rich that fertilizers are not necessary.

TEST FOUR. *True reasons, false reasons, and facts.*

Place a cross before each of the four true reasons that help to explain "Why the South is beginning to raise many other things besides cotton."

____ 1. Most of the work on the plantations is done by negroes.
____ 2. More and more cotton is being ruined by the boll-weevil.
____ 3. The farmer can more nearly provide all the food his family needs.
____ 4. The farmer has been producing more cotton than the world needs.
____ 5. Cotton is being grown so cheaply in other countries that the southern farmer cannot grow it at a profit.
____ 6. Cotton is the leading crop in the southern states

____ 7. The cotton mills of the South are beginning to use large quantities of cotton.
____ 8. The soil is made better by rotation of crops.
____ 9. The farmer has been able to borrow money on his cotton crop.
____ 10. The farmer has a better chance of raising a good crop of some product.

11. The Branom Practice Tests. These tests have been illustrated in Chapter Twelve, and will help the teacher, irrespective of the methods she may use, to stress the proper content. The progress of each individual is definitely measured. The pupil is prompted to acquire skill in the proper use of the textbook and supplementary material. Suitable emphasis is placed on places, facts, and problems. The tests should be an interwoven part of the daily work of the child, which permits the teacher to keep a close check on individual achievement, and to provide, if necessary, remedial measures. The tests have high teaching values supplemental to their use as measuring rods. They cover the geographic field.

Tendencies in the construction of geography tests. An analysis of available tests and scales reveals an increasing tendency to construct the tests on an absolutely objective basis. This objectivity is primarily secured through controlling the answers from which the pupil makes a selection. The simple locational tests of a few years ago are being supplemented with tests of an informational and interpretative nature. Tests dealing with miscellaneous geography are gradually giving way to tests which deal, by sampling, with the important divisions of geography.

CHAPTER TWELVE

Practice Tests in Geography

Nature of practice tests. A final test may be preceded by a series of practice tests. These tests may cover the assignments in a more detailed way than the final test. The practice test may be divided into exercises, each of which measures the progress of the student with reference to a definite phase of geography. The pupil may discover in what respect his preparation is inadequate. The practice test should lead to increased endeavor to master the topics.

The practice test may be used as a measure of progressive achievement. It may also be used as a basis for achievement. The pupil, with the use of the textbook and supplementary materials, may verify and, if necessary, discover the answers to the questions raised. An assigned test gives the pupil a definite task to perform. The pupil cannot neglect the test without being discovered. A more general conscientious preparation of work is thus encouraged.

Illustrations of practice tests. The following illustrations, taken from Branom, *Practice Tests in Geography*, The Macmillan Company, 1925, will suggest the possibilities of practice tests in geography:

THE BRANOM PRACTICE TESTS IN GEOGRAPHY

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Student's Name..... Date..... Grade.....

LESSON FOUR Total possible points, 3 Points made,

NORTHEASTERN UNITED STATES — NEW ENGLAND GROUP

(Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island)

Exercise. Right-Wrong Paragraphs

Write the word "Right" before the paragraph that is the best discussion of each of the following topics.

1. Discuss the surface of New England.

_____ 1. New England has a hilly lowland along the coast and a hilly upland away from the coast. There are mountains in the west and north. The highest elevations are in the northern states. The large rivers in general flow southward. They have many waterfalls and rapids. There are many lakes and swamps. The coastline, in general, is rough and uneven.

_____ 2. New England has a smooth coastal plain but a hilly upland away from the coast. Some parts are mountainous. The highest mountains are in New Hampshire. The streams, in general, flow eastward. New England is a well-drained region. The streams have many fine waterfalls. The coastline is hilly and uneven.

_____ 3. Except where there are mountains, New England is not a very hilly region. The coastline, however, is hilly and uneven. Much of New England, especially the southern part, has very poor drainage. There are many waterfalls and rapids in the mountains. Elsewhere, the rivers are, for the most part, navigable. The important rivers, in general, flow southward.

2. Discuss the climate of New England.

_____ 1. The prevailing winds, which blow from the sea, give mild winters and cool summers. These winds bring heavy rains. Fogs are common along the coast. The nearness of the ocean causes the growing season to be about the same length throughout New England. The "northeaster" is a raw, cold wind, because the air is blowing off cold seas.

_____ 2. The prevailing winds, which blow from the land, give cold winters and hot summers. In the mountains the winters are colder because of altitude. Near the sea the summers are cooler because of sea breezes. The growing season is about two months longer in southern New England than in the northern part. Each season has about the same amount of rainfall.

_____ 3. The prevailing winds blow from the land in summer and from the sea in winter. So New England has hot summers and mild winters. The rainfall is heaviest in winter when the wind blows from the sea. Snowfall rarely occurs. Lands which are high or near the ocean have cool summers. The growing season is longer in southern New England than in northern New England.

3. Discuss farming in New England.

_____ 1. Many of the early settlers depended on farming for a living. Their big task was to cut down the trees. The land, in general, is just hilly enough to be well drained. The ice sheet which covered New England many years ago left the land covered with a deep, fertile soil, that could be easily cultivated. As the cities grew, the need for farm products increased. The farmers prospered. New England has come to be a leading agricultural section of the United States.

_____ 2. New England, in general, is hilly and in places even mountainous. The ice sheet which covered New England many years ago left much of the land with a soil which contains many bowlders. Much of the soil on the steep slopes is very thin. In northern New England the growing season is only about four months long, while the winters are snowy and cold. The competition of better lands elsewhere, and the attraction of the many cities, have caused the people to neglect farming.

_____ 3. New England, in general, is hilly. In the northern part are mountains and many lakes. The early settlers cut down the trees and removed the bowlders. The rich soil yielded large crops. The high price paid for farm crops caused many people to live on farms. As a result New England stands high in agriculture.

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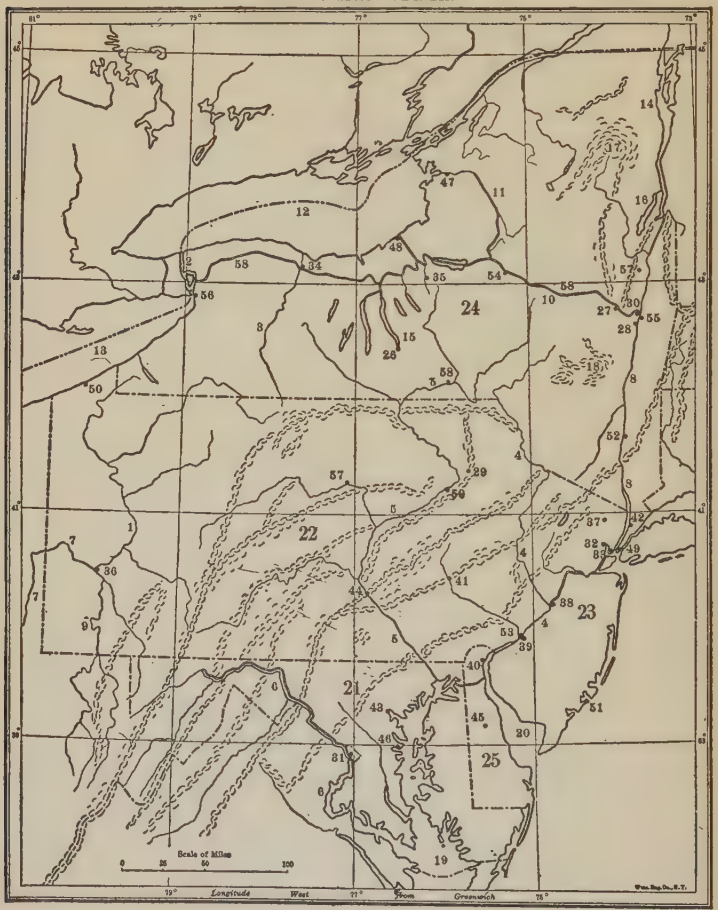
Student's Name..... Date..... Grade.....

MAP FOR LESSON THIRTEEN



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Student's Name..... Date..... Grade.....

LESSON THIRTEEN Total possible points, 58 Points made,

NORTHEASTERN UNITED STATES — MIDDLE ATLANTIC GROUP

(New York, Pennsylvania, New Jersey, Maryland, Delaware)

Exercise. The Distribution of Physical and Cultural Features

Opposite each place name listed below, indicate the number which represents it on the outline map.

Rivers

Delaware.....
Susquehanna.....
Ohio.....
Monongahela.....
Allegheny.....
Niagara.....
Hudson.....
Black.....
Genesee.....
Mohawk.....
Potomac.....

Lakes

Champlain.....
George.....
Cayuga.....
Erie.....
Ontario.....

Mountains

Catskill.....
Adirondack.....

Adjoining Water Bodies

Delaware Bay.....
Chesapeake Bay.....

States

Maryland.....
Delaware.....
New Jersey.....
Pennsylvania.....
New York.....

Cities

Reading.....
Camden.....
Paterson.....
Syracuse.....
Jersey City.....
Washington.....
Pittsburgh.....
Philadelphia.....
New York.....
Baltimore.....
Buffalo.....
Newark.....
Rochester.....
Scranton.....
Trenton.....
Wilmington.....
Yonkers.....
Dover.....
Albany.....
Harrisburg.....
Oswego.....
Watertown.....
Annapolis.....
Atlantic City.....
Erie.....
Ithaca.....
Cohoes.....
Poughkeepsie.....
Utica.....
Saratoga Springs.....
Troy.....
Schenectady.....

Transportation

New York Barge Canal.....

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Student's Name..... Date..... Grade.....

LESSON FOURTEEN Total possible points, 46 Points made,

THE NORTH CENTRAL STATES

(North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana, Ohio)

Exercise One. States and Their Capitals. 12 Points

Indicate, by state abbreviation, the state of which each of the following cities is the capital:

1. Bismarck.....
2. Springfield.....
3. Topeka.....
4. Columbus.....
5. Indianapolis.....
6. Jefferson City.....
7. Des Moines.....
8. Lincoln.....
9. Lansing.....
10. Madison.....
11. Pierre.....
12. St. Paul.....

Exercise Two. Largest Cities and States. 12 Points

After each state, write the name of its largest city.

1. Ohio.....
2. Illinois.....
3. Michigan.....
4. Wisconsin.....
5. Minnesota.....
6. Iowa.....
7. Indiana.....
8. North Dakota.....
9. South Dakota.....
10. Nebraska.....
11. Missouri.....
12. Kansas.....

Exercise Three. Cities and Universities. 8 Points

Indicate the city in which each of the following universities is located:

1. University of Michigan.....
2. University of Nebraska.....
3. University of Missouri.....
4. University of Illinois.....
5. University of Wisconsin.....
6. Ohio State University.....
7. University of Minnesota.....
8. Northwestern University.....

Exercise Four. States and Products. 14 Points

Indicate the state of this group which ranks first in each of the following products:

1. Iron Ore.....
2. Hogs.....
3. Wheat.....
4. Tobacco.....
5. Copper.....
6. Flax.....
7. Salt.....
8. Lead and zinc.....
9. Corn.....
10. Dairy cattle.....
11. Sugar beets.....
12. Potatoes.....
13. Coal.....
14. Apples.....

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Student's Name..... Date..... Grade.....

LESSON THIRTY-ONE Total possible points, 15 Points made,

THE SOUTHERN STATES — WESTERN GROUP

(Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas)

Exercise One. Problems. 4 Points

1. Why is New Orleans an important city?

(1) _____

(2) _____

2. How is Louisiana favored in the production of sugar cane?

(1) _____

(2) _____

Exercise Two. Causes and Effects. 6 Points

Write "+" before each statement in which the conclusion is true. Write "−" before each statement in which the conclusion is not true.

_____ 1. The "corn belt" is in the North Central States. Therefore, corn is not an important crop in the South Central States.

_____ 2. The South Central States have many cattle. Therefore, dairy cattle are more important than beef cattle.

_____ 3. New Orleans, about 100 miles from the mouth of the Mississippi, is connected with the ocean by a deep channel. Therefore ocean vessels can reach New Orleans.

_____ 4. The South has much water power, petroleum, and coal. Therefore the leading industry is manufacturing.

_____ 5. Cotton is a very prosperous crop. Therefore the boll weevil is under control so that its ravages no longer are feared.

_____ 6. The delta lands of the Mississippi are adapted to sugar cane. Therefore, the United States does not need to import sugar.

Exercise Three. Cities and Products or Activities. 5 Points

After each product or activity, write the name of the city most closely related to it. Use each of the following cities once only.

Cities.—1. Knoxville. 2. Ranger. 3. Oklahoma City. 4. Fort Smith. 5. New Orleans

Products or Activities

1. Meat packing..... _____
2. Lumber..... _____
3. Copper and zinc..... _____
4. Cotton..... _____
5. Petroleum..... _____

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Student's Name..... Date..... Grade.....

LESSON THIRTY-FIVE Total possible points, 15 Points made,

THE WESTERN STATES

(Montana, Wyoming, Colorado, New Mexico, Idaho, Nevada, Utah, Arizona, Washington, Oregon, California)

Exercise One. Cities Located by Physical Features. 5 Points

After the name of each physical feature, write the name of the city, taken from the following list, that is related to it:

Cities. — 1. Denver. 2. Bingham. 3. Seattle. 4. Los Angeles. 5. Billings. 6. Astoria. 7. Sacramento. 8. Pasadena. 9. Ogden. 10. Albuquerque.

Physical Features

1. South Platte River..... _____
2. Puget Sound..... _____
3. Yellowstone River..... _____
4. Columbia River..... _____
5. Rio Grande..... _____

Exercise Two. Cities and Products or Activities. 5 Points

After the name of each city, write one of the products or activities, taken from the following list, most closely related to the city. Do not use any product or activity more than once.

Products or Activities. — 1. Copper. 2. Rice. 3. Corn. 4. Coal. 5. Salmon canning. 6. Resort. 7. Sugar cane. 8. Cotton. 9. Phosphates. 10. Sheep.

Cities

1. Butte..... _____
2. Long Beach..... _____
3. Trinidad..... _____
4. Bellingham..... _____
5. Billings..... _____

Exercise Three. Cities and Products or Activities. 5 Points

After the name of each city, write one of the products or activities, taken from the following list, most closely related to the city. Do not use any product or activity more than once.

Products or Activities. — 1. Copper. 2. Nickel. 3. Silver and lead. 4. Tobacco. 5. Silk. 6. Salmon canneries. 7. Moving pictures. 8. Cattle. 9. Naval stores. 10. Diamonds.

Cities

1. Cœur d'Alene..... _____
2. Bisbee..... _____
3. Astoria..... _____
4. Los Angeles..... _____
5. Cheyenne..... _____

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Student's Name..... Date..... Grade.....

LESSON FORTY-SIX Total possible points, 24 Points made,

CANADA AND NEWFOUNDLAND

Exercise One. Choice of Words. 10 Points

In each sentence, draw a line through the words that make the statement wrong.

1. Canada is {smaller than / larger than} the United States.
2. The continental glacier formed {many / few} lakes in Canada.
3. The surface of the maritime provinces resembles the {North Central States. / New England States.}
4. Halifax is {nearer to / farther from} Liverpool than Boston.
5. {Much / Little} water power is secured from Niagara Falls.
6. Canada {exports / imports} much coal, cotton, and corn.
7. Canada {imports / exports} much lumber, pulp wood, and wheat.
8. {Wheat / Corn} is the most important product of the Prairie Provinces.
9. The most valuable tree of western Canada is the {Mountain Pine. / Douglas Fir.}
10. Most of the people of Canada live in the {southern / northern} part.

Exercise Two. True-False Statements. 14 Points

On the first line below write the numbers of the statements that are true; on the second line, write the numbers of the statements that are not true. Separate the numbers by commas.

True _____

False _____

1. The continental glacier left a heavy deposit of soil over northeastern Canada.
2. North of Lake Superior and Lake Huron is a vast prairie.
3. Canals have been built around the rapids of the St. Lawrence River.
4. The Chinook winds from the western mountains melt the snow.
5. On the farms of the prairie provinces, the long days help to make up for the short summer season.
6. British Columbia has important coal beds.
7. The cod is the most important fish of British Columbia.
8. Canada has fewer people than New York City.
9. Most of the people of Newfoundland live in the western part.
10. Newfoundland furnishes much wood pulp and paper.
11. Canada is part of the British Empire.
12. Lumbering is the chief occupation of Labrador.
13. The Barren Lands are in the northern part of Canada.
14. Both British Columbia and Nova Scotia are known for apples.

THE BRANOM PRACTICE TESTS IN GEOGRAPHY

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Student's Name..... Date..... Grade.....

LESSON FIFTY-SIX Total possible points, 30 Points made,

South America

Place a cross in front of each statement that you think helps to answer the problem.

Exercise One. 10 Points

Why do most of the people of Brazil live in the southern part and near the coast?

_____ 1. The Amazon lowlands are hot and rainy and breed disease.
_____ 2. The building of railroads across the mountains of south Brazil has been very difficult and expensive.
_____ 3. There are thousands of miles of navigable waters in the Amazon Basin.
_____ 4. Valuable minerals are found in the mountains of southern Brazil.
_____ 5. Rio de Janeiro is the largest city of Brazil.
_____ 6. Southern Brazil is favorable for the raising of coffee.
_____ 7. Corn can be readily grown in southern Brazil.
_____ 8. Frosts occasionally injure the coffee berries.
_____ 9. Southern Brazil has several excellent harbors.
_____ 10. There are no important navigable rivers in southern Brazil.

Exercise Two. 10 Points

Why are the Caribbean seaports of Colombia more important than the Pacific seaports?

_____ 1. A railroad has been constructed from the Pacific Coast to the Magdalena Basin.
_____ 2. Bananas are exported in large quantities from a Caribbean port.
_____ 3. The Magdalena River drains northward into the Caribbean Sea.
_____ 4. Coastwise commerce is carried on between Pacific ports of Colombia and Ecuador.
_____ 5. The plateau of Bogota can be most easily reached from the seacoast by way of Magdalena River.
_____ 6. It is believed that one of the mouths of the Magdalena River can be deepened by means of jetties.
_____ 7. The distributaries of the Magdalena River are very shallow.
_____ 8. The hot, damp lowlands of the Caribbean Coast are very unhealthful.
_____ 9. Railroads have been constructed from the navigable part of the Magdalena River to seaports on the Caribbean Sea.
_____ 10. Coffee, on the slopes of the Magdalena Basin, is exported by way of the Magdalena River.

Exercise Three. 10 Points

Why is it difficult to develop the resources of Peru?

_____ 1. The soil of the coastal plain is very fertile.
_____ 2. The mining districts of the mountains are connected with seaports by railroads.
_____ 3. There are practically no navigable rivers in the western part of Peru.
_____ 4. Copper and the precious metals are important products of the mountains.
_____ 5. Railroad building in the mountains is very expensive.
_____ 6. The thin air of high altitudes is hard on people who have lived, from childhood, in lower altitudes.
_____ 7. Sugar and cotton are important products of the coastal plain.
_____ 8. Rubber is secured in the eastern lowlands.
_____ 9. The rainfall of the coastal plain is very light.
_____ 10. Most of the people seem satisfied with conditions as they are.

THE BRANOM PRACTICE TESTS IN GEOGRAPHY

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Student's Name..... Date..... Grade.....

LESSON SIXTY-ONE Total possible points, 33 Points made,

NORTHWESTERN EUROPE (The British Isles)

Exercise One. Cities and Products or Activities. 8 Points

Write the name of the product or activity, taken from the following list, that is most closely related to each of the cities.

Products or Activities— 1. Iron and steel. 2. Cutlery. 3. Steel ships. 4. Woolen cloth. 5. Cotton cloth. 6. Linen cloth. 7. Coal exports. 8. Fish.

Cities

1. Aberdeen.....
2. Manchester.....
3. Birmingham.....
4. Cardiff.....
5. Sheffield.....
6. Glasgow.....
7. Leeds.....
8. Belfast.....

Exercise Two. Incomplete Sentences. 14 Points

1. The two largest islands are _____ and _____.
2. The British Isles are _____ than the state of California, but have _____ _____ as many people as the United States.
3. The _____ River is navigable upstream as far as the city of London.
4. The Clyde River is navigable upstream to the city of _____.
5. In early days ships came to England from the Mediterranean to secure the metal, _____
6. No part of Great Britain is more than about _____ miles from salt water.
7. Fish are caught chiefly in the _____ Sea.
8. The Strait of Dover is about _____ in width.
9. _____ is the highest mountain peak of the British Isles.
10. The two most valuable minerals of Great Britain are _____ and _____
11. Great Britain secures most of its raw cotton from the _____ though some comes from _____ in Africa, and _____ in Asia.
12. Near London are the two famous Universities _____ and _____
13. The capital of Great Britain is _____, of Ulster is _____, and of the Irish Free State is _____.
14. England is separated from France by the _____ Channel, from Denmark by the _____ Sea, and from Ireland by the _____ Sea.

Exercise Three. Affirmative-Negative Statements. 11 Points

Draw a line through "not" in each sentence if this is necessary to make the statement true.

1. The great farming region of England is not in the southeastern part.
2. The manufacture of woolen goods is not more important than the manufacture of cotton goods.
3. Nearly all of Wales is not mountainous.
4. The sea around the British Isles is not considered shallow.
5. The shore line of the British Isles is not irregular.
6. The mouths of the rivers are not drowned.
7. The prevailing winds are not from the east.
8. London is not located at the mouth of the Thames River.
9. The British government is not an absolute monarchy.
10. Scotland does not contain many lakes.
11. Most of the coal beds of England are not southeast of a line from Hull to Bristol.

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Student's Name..... Date..... Grade.

LESSON EIGHTY–ONE Total possible points, 37 Points made,

SOUTHWEST ASIA

(Turkey, Syria, Palestine, Georgia, Armenia, Arabia, Azerbaijan, Mesopotamia, Persia, Afghanistan)

Exercise One. Incomplete Sentences. 30 Points

1. A large part of southwest Asia lies in the belt of the northeast _____ winds.
2. The distance from Constantinople to the Indus River is about _____ miles; from Constantinople to Aden is about _____ miles; from Aden to the Caspian Sea is about _____ miles.
3. The _____, the _____, and the _____ religions began in southwest Asia.
4. The ruler of Turkey is called the _____; the ruler of Persia is called the _____; the ruler of Afghanistan is called the _____.
5. _____ is often called the Gibraltar of the East.
6. The _____ Canal is under the control of _____.
7. The possession of _____ gives the British control of the southern entrance to the _____ Sea; the control of Gibraltar gives the British control of the entrance to the _____ Sea.
8. Mesopotamia is under the control of _____; Syria is under the control of _____; Palestine is under the control of _____; most of Asia Minor is under the control of _____.
9. The Plateau of _____, the Plateau of _____, and the Plateau of _____ are in southwest Asia.
10. The Armenians belong to the _____ race, and believe in the _____ religion.
11. The island of _____, off the coast of Syria, is governed by the country of _____
12. The Jordan River empties into the _____ Sea.
13. The city of _____, on the Black Sea, has been, for a long time, the starting point of caravans going to Persia.
14. The word Mesopotamia means _____.

Exercise Two. Problems. 7 Points

1. Why is agriculture difficult in southwest Asia?
   (1) _____
   (2) _____
2. Why do the winds of southwest Asia bring little rain?
   (1) _____
   (2) _____
3. Why has southwest Asia lost its former importance?
   (1) _____
   (2) _____
4. Why were the British and the Germans in danger of becoming enemies in southwest Asia?
   (1) _____

The problem, "Account for the importance of New York City," may be interpreted by stating that New York City (1) has a good harbor, (2) faces a large ocean, and (3) is connected with the interior by excellent routes. General statements may be used to interpret a still more comprehensive general statement. The pupils may "finish" a study of New York City without securing adequate impressions of concrete details or a knowledge of place names. The interpretation of the problem should involve the use of a wealth of concrete details. Definite place names, such as Manhattan Island, Long Island, Staten Island, the Hudson River, the East River, and the Mohawk River, should be an interwoven part of the discussions. The problem method does not excuse a teacher from developing a knowledge of concrete details; it offers an opportunity to teach concrete details in relation to a highly motivated organizing center. A general statement should be resolved into parts that will be readily understood by the pupils. The practice tests will help the teacher to use the problem method effectively.

An analytical series of tests, dealing with the various regions and topics included in a course of study, should be very helpful in reënforcing the ordinary type of assignment and class discussion. Material for practice tests should be carefully selected with reference to the major aims to be realized. The exercises should clearly set forth the nature of the work to be done. The questions included should require definite and exact answers. The opportunities given for expression work will deepen the impressions made on the mind of the student.

CHAPTER THIRTEEN

The Interpretation of the Results of Objective Measurements

Steps in testing. After the tests are given, the papers must be scored. The results are then tabulated, and the distributions shown by tables or various graphic devices. Whether the time devoted to the test is justified or not is determined by the use that is made of the results. The test is of little value if the teacher merely stops with her discovery of distributed class achievement. She should attempt to interpret the results. Remedial measures, if desirable, should be undertaken as a result of her study of the results.

Comparisons with other data. The Branom Tests, A, United States, were recently given to a class of 24 pupils. The scores made by the pupils were compared with their intelligence quotients. It was found that the pupil with the highest I. Q. ranked highest in the achievement tests; the pupil with the lowest I. Q. ranked lowest in the tests. There was a high degree of correlation between the achievement of each pupil and the intelligence quotient. Although some of the pupils made a very poor showing, the high correlation with the intelligence quotient indicated that the teacher was doing very efficient work.

The Branom Tests B, Asia, was given to a class of 27 pupils. The pupil who ranked highest had an intelligence

quotient of 90. An investigation established the fact that this pupil was very industrious and was encouraged and assisted at home to do good work. The health of the pupil was good, so no attempt was made to lighten the load of the pupil. If it had been found that the pupil was overworking, remedial measures would have been taken. The pupil who ranked lowest had an intelligence quotient of 97. An investigation showed that he had not become interested in the work and was making no particular effort to master the assignments. The teacher gave him more responsibility in making special reports, and sought to interest him in the work. In the next achievement test on Africa, he stood in the upper third of his class.

A comparison of the results of achievement testing with the intelligence quotients helps to discover whether pupils are doing the work that should be expected of them. If certain pupils are not capitalizing their native ability, remedial measures should be taken. If pupils are doing much better work than should be expected, care should be exercised lest they harm themselves in other ways.

A teacher with a bright class can make a better showing than a teacher with a dull class. Unless the results of instruction are compared with the intelligence quotients, supervisors may rate teachers unfairly. The comparison helps to discover whether, with reference to the class the teacher has, she is doing poor, mediocre, or excellent work. The principal of a school is similarly protected when the achievement of his pupils is compared with that of the pupils of other schools.

Relative emphasis. A test which includes samples of various things that should be stressed indicates whether adequate emphasis is being placed on the various phases of geography. If the class is very weak on place locations, or in the interpretation of the problematic organization of material, more attention should be paid to these phases. The tests should assist in maintaining or in securing the proper emphasis of geographic material.

Comparative study of subject grades. The scores made by pupils in geography tests may be compared with the scores which they make in other subjects. If the scores in geography are unusually high, but very low in other subjects, perhaps geography is being unduly stressed. The converse of this statement is also true. If pupils are not scored in every subject, there is a tendency for the teachers to stress those subjects in which standard tests are given. Not only should each phase of a subject be properly stressed, but each subject should also be properly stressed.

Comparison with other groups. The medians and distributions should be compared with preceding classes, with other schools, and with the norms accompanying the tests. If the correlation is high or low, the true explanation should be sought. The results may simply confirm the content that has been selected and the methods that have been used; more frequently they suggest changes that should be made.

Comparison of methods. A comparative study may be made of the scores made by a group taught by the problem method and another group taught by the topical method. If other factors that may enter into the progress of the

child are practically equalized, the class with the highest score was taught by the superior method.

Remote *versus* immediate recall. Immediately after studying a region, a class may be given a standardized test. Some weeks later, without in the meantime having referred to the region, the teacher may give the class the same test, or a substitute test provided by the test makers. A comparative study of the scores will indicate whether there is a high degree of correlation. The author's studies indicate, that, with unimportant exceptions, pupils who rank high in immediate recall also rank high in remote recall, and pupils who rank high in remote recall also rank high in immediate recall. This conclusion, if valid, is of marked educational value. Under the practical conditions of teaching, the parties interested cannot afford to wait until some remote time to discover whether the pupils have learned much or little. If the pupils who learn the most, tend to retain the most, the test based on immediate recall will give a higher median but a similar distribution of pupils. A comparison of the reactions of students on the two types of tests should also be a stimulus in the direction of attempting to devise methods that will cause pupils to retain somewhat indefinitely a larger part of their school experiences.

Placement of objective tests. The teacher may do the pupil a grave injustice if his classification and promotion depend exclusively on objective tests. Objective tests, sufficiently comprehensive and diagnostic in nature, have not yet been devised in the field of geography. The objective test, while an excellent check on the pupil's work,

in turn should be checked with other data. The daily work of the child, as revealed through his written preparation and his oral recitation, the subjective test which requires the pupil to recall and organize his experiences, the teacher's judgment as a specialist, the attitude of the child, the relative maturity of the child, and the out-of-school activities, are some of the factors that, in varying degree, may influence the teacher in determining how a given pupil may be helped to get the most out of his school work.

While it may be admitted that many other factors than the objective test should determine a child's classification, or even standing in class, it should be recognized that the definite measure of achievement that anyone can understand is secured through the objective tests. The objective test scores, therefore, should be used as a basis for a final grade, and should not be modified except for very good reasons.

BIBLIOGRAPHY

Adams, Wm. C. T.— *Practical Methods for Teaching Elementary Geography*, Chapter IX. Hinds, Hayden, and Eldredge, 1921, Philadelphia.

Barthelmess, H. M.— "Geography Testing in Boston," *Journal of Educational Research*, **2**, 701–12, November, 1920.

Branom, M. E. and F. K.— *The Teaching of Geography*, Chapter XXI. Ginn & Co., 1921, Boston.

Branom, M. E. and Reavis, W. C.—"The Determination and Measurement of Minimal Essentials of Elementary School Geography," *Seventeenth Year-book of the National Society for the Study of Education.* Public School Publishing Co., 1918, Bloomington, Ill.

Buckingham, B. R. and Stevenson, P. R.—"Place Geography Tests," *Educational Research Bulletin*, **1**, 106–108, September 13, 1922. Bureau of Educational Research, Ohio State University, Columbus, Ohio.

Courtis, S. A.—"Measuring the Effects of Supervision in Geography," *School and Society*, **10**, 61–70, July, 1919.

Cram, F. D.—"The Scores of a Group of Rural Teachers of Courtis Standard Supervisory Tests in Geography," *Journal of Educational Research*, **2**, 515–17, June, 1920.

Gregory, C. A. and Spencer, P. L.—"A Geography Test for Sixth, Seventh, and Eighth Grades," *School and Society*, **15**, 452–56, April 22, 1922.

Johnson, D. W.—"College Entrance Examination Answers in Geography," *Journal of Geography*, **15**, 125–27, 1916.

Kendall, C.—"Standards and Tests of Efficiency in Geography," *Journal of Education*, **79**, 315–16, March 19, 1916.

Lackey, E. E.—"A Scale for Measuring the Abilities of Children in Geography," *Journal of Educational Psychology*, **9,** 443–51, October, 1918.

Lackey, E. E.—"Measuring the Ability of Children in Geography," *Journal of Geography*, **16,** 184–88, January, 1918.

McCall, W. A.— *How to Measure in Education*, page 416. Macmillan Co., 1922, N. Y.

McCall, W. A.—"A New Kind of School Examination," *Journal of Educational Research*, **1,** 33–46, January, 1920.

Monroe, W. S., De Voss, J. C., and Kelly, F. J.— *Educational Tests and Measurements*, Chapter VII, pp. 272–282. Houghton Mifflin Co., 1924, N. Y.

Parker, Edith—"Evaluating Tests in Geography," *Journal of Geography*, **21,** 121–131, April, 1922.

Report of Boston's attempt to ascertain results of geography teaching.—"School Document No. 14," *Journal of Geography*, **15,** 141–49, 1917.

Report of the Committee on Geography.— *Studies in Elementary Education, No. 2.* University of California, Bureau of Research in Education. *Studies Nos. 9 and 10, Berkeley.* University of California, May, 1922.

Stevenson, P. R.—"A Problem Test in Geography," *Journal of Educational Research*, **5,** 350–53, April, 1922.

Stevenson, P. R.—"Minimum Essentials in Place Geography," *Journal of Educational Research*, **6,** 300–6, November, 1922.

Stevenson, P. R.—"Recent Development in Geography Testing," *Journal of Geography*, **22,** 121–132, April, 1923.

Whitbeck, R. H.—"A Test in General Geography," *Journal of Geography*, **16,** 149–52, December, 1917.

Witham, E. C.—"Standard Geography Tests in the World," *Journal of Educational Psychology*, **9,** 432–42, October, 1918.

Witham, E. C.—"A Minimum Standard for Measuring Geography," *American School Board Journal*, **50,** 13–14, January, 1915.

Gilliland, A. R. and Jordan, R. H.— *Educational Measurements and the Classroom Teacher*, Chapter X, pp. 154–164. The Century Co., 1924, N. Y.

GEOGRAPHY TESTS AND SCALES

1. *Branom Place, Factual, and Problem Tests.* Duplicate forms for each of the continents, except Australia, and duplicate forms for the United States and the World. McKnight & McKnight, Normal, Ill., 1924.
2. *The Branom Practice Tests in Geography.* The Macmillan Co., N. Y. 1925.
3. *Buckingham-Stevenson Place Geography Tests.* The World and the United States, Forms, 1, 2, and 3. *Buckingham-Stevenson Information-Problem Test in United States Geography,* Form 1. Public School Publishing Co., Bloomington, Ill., 1922.
4. *Courtis Standard Supervisory Test in Geography.* S. A. Courtis, 246 Eliot Street, Detroit, Michigan.
5. *Gregory-Spencer Geography Tests.* For grades 6, 7, and 8. Bureau of Administrative Research, University of Cincinnati, Cincinnati, Ohio.
6. *Hahn-Lackey Geography Scale.* H. H. Hahn, State Normal School, Wayne, Nebraska.
7. *Iowa Geography Test—Part 1. Extension Division.* Iowa State Teachers College.
8. *Map Test of Canada.* G. W. McGill, The University of Toronto Press.
9. *Posey-Van Wagenen Geography Scales. Information and Thought Tests.* Public School Publishing Co., Bloomington, Ill., 1921.
10. *Starch's Geography Test. Series A.* University Coöperative Co., 504 State Street, Madison, Wisconsin.
11. *Thompson's Minimum Essentials in Geography.* Ginn & Co.
12. *Whittier State School Geography Scale.* Whittier State School, Whittier, California, 1920.

13. *Witham's Standard Geography Tests.* Test on each of the continents, except Australia, also the United States, the World, and Commercial Geography. J. L. Hammett Co., Cambridge, Massachusetts.

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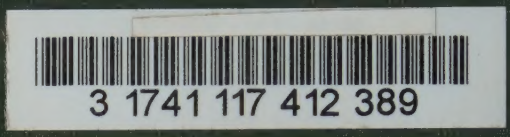
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